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The economic costs of ill health in the European Region

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Key messages

- Economic development is generally good for health, but health can also bring substantial economic benefits. Several years ago, the WHO Commission on Macroeconomics and Health demonstrated this for developing countries, and there is now considerable work demonstrating the health-to-wealth relationship within the WHO European Region.
- Evidence on the economic costs of ill health is essential to any assessment of the economic return on investing in health, but what those costs mean and how they should be measured must be understood to ensure that such investments are made wisely.
- In light of the heterogeneity of views in the public debate about what “the economic costs of ill health” actually means, clarifying the different cost concepts and assessing their respective relevance is important. We can divide these concepts into three types of cost: (1) welfare, (2) micro- and macroeconomic and (3) health care.
- The *welfare* costs of ill health are the most encompassing and measure the value individuals attribute to health. This includes the intrinsic value of health and far exceeds the earnings an individual would gain by living a longer, healthier, more productive life. While the value people attribute to health is high, it is not infinite.
- The value people attribute to health is difficult to measure: there is, of course, no market price. Such value can be inferred, however, from the decisions people make in situations that involve a trade-off between money and health, for instance in deciding to require greater compensation to perform dangerous jobs.
- A simple calculation reveals that in many WHO European Region countries between 1970 and 2003, the welfare gains associated with improvements in life expectancy totalled 29–38% of gross domestic product (GDP) – a value far exceeding each country’s national health expenditures.
- *Microeconomic* and *macroeconomic* costs are more tangible but more limited measures of the costs of ill health.
- At the microeconomic level, there is substantial and growing evidence suggesting that ill health reduces individuals’ labour productivity and labour supply. Health status even emerges as the main determinant of labour supply by older workers in several studies.
- Findings are more mixed at the macroeconomic level. Considerable literature suggests that ill health is bad for economic growth in developing countries, but recent research contradicts that view. Work on developed countries is limited.
- “A healthier population means less spending on costly health care” sounds plausible, but is it true? The evidence is equivocal. Even if better health may, in some circumstances, lead to lower health spending, other cost drivers, in particular technological advances, will more than outweigh any savings from improved health. On the other hand, there is also not much support for the hypothesis that better health by itself would be a major cost driver.
- It is useful to document whether and how better health produces tangible micro- and macroeconomic benefits, and how it may (in some cases) reduce future health-care costs. But these economic benefits are very small compared with the broader and more relevant welfare economic gains expressed as the monetary value people attribute to health improvements.
- Policy-makers should be encouraged to factor welfare gains into their economic evaluations of health interventions. Failure to do so risks understating their true economic benefits.

Executive summary

All else being equal, greater wealth affords the choices that make it easier to lead healthy lives. Greater personal wealth allows individuals to choose healthy diets, live in healthy places, take exercise, and have timely access to effective health care. Countries that are wealthy have the resources to create healthy and safe environments and to provide timely and effective health care. But does better health lead to greater wealth, either for an individual or a society?

The WHO Commission on Macroeconomics and Health sought to address this question several years ago. Noting that policy-makers have long accepted the case for investment in physical infrastructure and human resources as a means of promoting economic growth and reducing poverty, the Commission presented the case for making similar investments in health. It paid little attention, however, to Europe, instead focusing on the urgent public health crises in Africa. That focus was entirely justified, but it left unanswered how the relationship between health and economic development plays out in the WHO European Region. Since the Commission issued its report, a substantial amount of research has been undertaken in the Region, and this report reviews its key findings.

Evidence on the economic costs of ill health (or, reversely, the benefits of good health) is essential in assessing the economic return on health investment. But understanding what those costs/benefits mean and how they should be measured is equally essential. Public policy discourse on the economic consequences/costs of ill health has been handicapped by considerable confusion about what the term means. Noting that without an a priori definition of the cost concept at issue no meaningful discourse can ensue, we address three economic concepts.

1. The broadest, most relevant concept is social welfare costs/benefits, which attempts to capture the value people place on better health.
2. The more limited but more tangible concept, micro- and macroeconomic costs, looks at, for instance, the foregone earnings of individuals/households and the GDP losses countries incur, respectively, due to the ill health of a household member or the national population.
3. The most limited but nevertheless widely applied cost concept looks at the additional health-care expenditures that may be associated with ill health.

Social welfare costs

From a welfare economic perspective, the most relevant cost concept is the value individuals attribute to better health. For standard goods and services there exists an

attributed measure of value in the market price, but not for health. Thus, despite risking controversy and acknowledging the methodological difficulties, one must elicit the value people attribute to health. This can be done by analysing either how people act or how they answer certain questions related to real or hypothetical situations involving a trade-off between money and health. It turns out that the social welfare benefit of health is clearly very high: much higher than the other more conventional (but incomplete) measures, and far too high to be ignored in public policy decisions. This value also captures the intrinsic value of health, a feature not shared by the other concepts.

Evaluating the evolution in life expectancy in the WHO European Region in terms of the social welfare costs/benefits illustrates the monetary impact of the losses/gains. In the countries of the western part of the Region life expectancy grew appreciably between 1970 and 2003. The value of the life expectancy gains were worth 29–38% of GDP, varying by country and far exceeding each country's national health expenditures. In the eastern European countries, where comparable data were available only for 1990–2003, the variation was even greater. Some countries suffered declines in life expectancy and incurred a welfare loss of 16–31%, others gained in life expectancy and realized benefits of 12–31% of gross domestic product (GDP).

Micro- and macroeconomic costs

The microeconomic perspective assesses costs at the individual or household level, asking, for example, whether being ill reduces an individual's labour productivity or the likelihood that one will be in work. Macroeconomic consequences are viewed from the national economy level, generally considering whether ill health damages a country's economic growth. Both consequences are important for policy-makers, including those outside the health sector, and may encourage finance ministries to consider investing in health to achieve their economic objectives. The micro perspective is also specifically important for individuals, most of whom are unaware of the extent that avoidable ill health may affect different dimensions of their economic well-being.

At microeconomic level, we focus on the labour market impact of ill health without devaluing other channels, such as education and savings. The labour market is a key determinant of economic performance, and the comparatively low labour productivity and labour supply in Europe are among the prime reasons why the European economy continues to lag behind that of the United States. Research shows ill health to reduce labour productivity measured by earnings in several cases and

documents the importance of health in shaping labour supply. Good health, for instance, raises the probability of working in the first place. Health even emerges as the main, if not sole, determinant of labour supply by older workers in several studies.

At macroeconomic level, considerable work shows a robust impact of health on economic growth, but it relates to developing countries outside the Region. As much of this research confirms the importance of adult mortality (or life expectancy) for economic growth, we were able to apply the main findings to forecast the impact of different future adult mortality scenarios in a set of countries in central and eastern Europe and the Commonwealth of Independent States. We found that the macroeconomic gains are potentially quite large. Some very recent work, however, cautions against the expectation of major growth dividends from improved health. There is comparatively little work on health and growth in high-income countries, and the results of those studies are mixed. For example, using working-age cardiovascular disease mortality as a health proxy, we show that improving health does positively affect GDP growth. We also show that, in particular, if effective retirement age were delayed in step with longevity gains, many of the negative economic consequences ascribed to ageing societies could be mitigated. Health might then be better able to “deliver” its positive impact on the labour market, and thus the economy, by keeping more and healthier older people in the workforce. More research on the macroeconomic dimension, particularly in developed countries, is needed to verify these findings and further explain them.

Health-care costs

In the third cost category we focus even more narrowly, looking at how ill health affects what individuals and governments spend on health and whether investing in health now will save money in the future for those individuals or the health sector. The expectation that improved health in the future will mitigate or even reverse the trend of increasing health expenditures cannot be supported by the research evidence. Even if better health may, in some circumstances, lead to lower health spending, other cost drivers, in particular technological progress, more than outweigh any such savings. On the other hand, there is also not much support for the hypothesis that better health by itself would be a major cost driver.

Conclusions

Although this report does not cover the costs or benefits of interventions, it does have important policy implications. First, the estimates of the costs of ill health can be thought of as the upper limit of the economic benefits that could be derived from interventions. Second, by showing how ill health can improve social welfare, act as a drag on the economic situation of both

individuals and entire countries, and can (possibly) exert upward pressure on health expenditures, it may be possible to capture the attention of policy-makers outside the health system. Third, it clarifies one very important and all-too-often misunderstood point: while it is useful to show that better health produces tangible micro- and macroeconomic benefits, and may in some cases reduce future costs of health care, these economic benefits are very small compared to the relevant economic gains expressed as the monetary value that people attribute to better health. It is the latter that should be factored into the economic evaluation of health improvements, as failure to do so risks understating the true economic benefits derived from health interventions.

Economic costs of ill health in the European Region

1. Introduction

All else being equal, greater wealth makes it easier to live a healthy life, both at individual and population levels. Greater personal wealth allows us to choose healthy diets, live in healthy places, take exercise, and access effective health care when needed. Is the opposite also true? Does better health lead to greater wealth, either for an individual or a society? The WHO Commission on Macroeconomics and Health (1) addressed this question several years ago. Noting that politicians have long pursued economic growth by investing in physical infrastructure – such as roads, railways and, more recently, telecommunications – and in human resources, through education, the Commission presented the case for making similar investments in health. However, it said little of Europe. The Commission focused instead on the urgent public health crises facing sub-Saharan Africa, a region ravaged by the cycle of disease and poverty. That focus was entirely justified to initially understand the relationships between health and the economy, but left unanswered how this issue plays out in the WHO European Region. This document reviews some of the research findings on that unanswered question.

Since the Commission published its report, a significant amount of work addressing the question has been undertaken in the European Region.¹ In response, public discourse on the economic consequences/costs of ill health (or the economic benefits of good health) has been handicapped by considerable confusion about what people mean by the term. In this report we seek to address three different economic cost concepts, noting that without an a priori definition of the cost concept at issue, no meaningful debate can ensue. Fig. 1 introduces our overall concept of these costs and suggests the outline for this report.

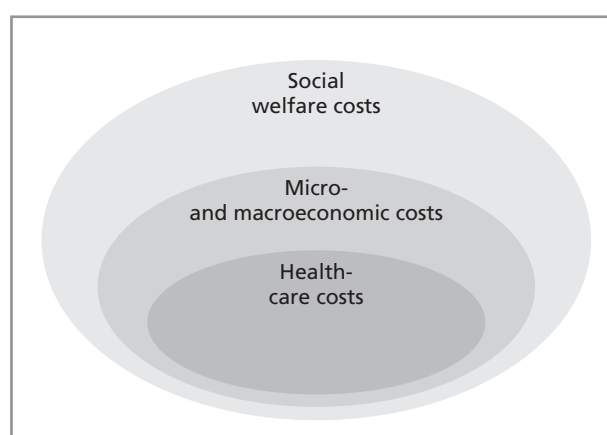
This document comprises three main sections followed by some concluding remarks. Section 2 discusses research findings on the broadest or most relevant concept: social welfare costs. From a welfare economic perspective, there is no doubt about what the true cost concept is: the value individuals attribute to better health. However, since health lacks an explicit market price that characterizes standard goods and services, we need to undertake extra effort to elicit the value people attribute to health. This is neither straightforward nor easy and may seem controversial, but the concept is widely accepted among economists.

In section 3 we look at a narrower, but more widely used concept of economic costs involving two categories, the micro- and macroeconomic costs of ill health. Here we ask such questions as, “Does illness reduce the likelihood that a person will be in work?” when taking the micro perspective and “Do improvements in a country’s health promote its economic growth?” at the macro level. On balance, there is a greater consensus on the evidence and importance of microeconomic costs than macroeconomic ones.

Narrowing the focus even more, section 4 looks at how ill health affects spending on health care. Policy-makers have long sought to know whether investing in health now will reduce health-care expenditure in the future. For instance, a highly controversial (and heavily criticized) report commissioned by a tobacco company suggested that smoking benefited the public finance balance in the Czech Republic because the behaviour killed people off before they became old, unproductive and costly through extended illness (5). By contrast, the claim that better health, primarily achieved by more prevention, would help reduce future health expenditures is not infrequently put forth in political debates around health-care reform (6). The truth, no doubt, lies somewhere between the extremes, and a number of partly countervailing factors determine the net effect.

It is beyond the scope of our discussion to examine the costs and benefits of specific interventions to improve health. We focus instead on different measures of the costs of ill health (or, reversely, benefits of good health). The important policy implications number at least three.

Fig. 1. Three concepts of economic costs



¹ Examples include works on the European Union countries (2), eastern Europe and central Asia (3) and the economic implications of noncommunicable diseases (4), all available with other country- and subregion-specific studies on the WHO Regional Office for Europe web site (www.euro.who.int/socialdeterminants/develop/20050929_1, accessed 20 April 2008).

First, the estimates of the costs of ill health can be thought of as the upper limit of the economic benefits that interventions could generate. Second, by showing how ill health can reduce social welfare, slow the economies of both individuals and entire countries and (possibly) exert upward pressure on health expenditures, it may be possible to capture the attention of policy-makers outside the health system. Third, while better health often produces tangible micro- and macro-economic benefits and may reduce future costs of health care, these are very small compared to the full economic benefit of improved health, which is the monetary value people attribute to better health. Policy-makers should, therefore, be encouraged to factor welfare costs into their economic evaluations of health improvements. Failure to do so risks understating the true economic benefits derived from health interventions.

2. Broad perspective: social welfare costs

Conventional measures of the economic progress of nations have important limitations. The most common measure, gross domestic product (GDP) per capita, is the sum of monetary transactions in an economy. It excludes those elements that do not have a market price, such as environmental or health benefits.² Yet the true purpose of economic activity is to maximize social welfare, and the production of market goods and services is a mere means to that end as well as an (imperfect) proxy for social welfare. The concept of social welfare does capture the utility people derive from being alive and healthy. The challenge then becomes that of quantifying social welfare gains attributable to health in monetary terms, so that they become comparable to GDP measures, a challenge recently accepted by several economists as well as key international economic organizations, such as the International Monetary Fund (IMF) (7) and the World Bank (8).

While not captured in GDP, health is highly valued. When asked hypothetically what they would be willing to pay for better health, people propose large amounts, so they do have some idea of its value. While high, it is not infinite, since people do not give up everything in exchange for better health.³

Much of the reservation about putting a monetary value on life and health stems from a misunderstanding of what such a value actually means. In fact, economists cannot – and do not seek to – place a monetary value on any identified person's life. Instead, they are valuing comparatively small changes in the risk of mortality, a very different matter. Although less elegant, it would be more appropriate to say “the value of small mortality

risk reductions” than “the value of life”. While normally no one would trade his or her life or health for money, most people weigh safety against cost in choosing safety equipment or against time when crossing a busy street. Those contemplating a dangerous job, such as in mining, will demand a wage premium in return for accepting greater risk. People obviously act as if life were not priceless and, in making these choices, are implicitly putting a price on (attributing a value to) changes in the risk of mortality.

One way to make the value attributed to health more explicit is by measuring the extent to which one is willing to trade health for those things that have a price. So-called willingness-to-pay (WTP) methods do precisely that, either by analysing how people act or how they answer certain questions. In “revealed-preference studies” economists infer WTP from the premiums people implicitly demand for accepting more hazardous jobs or from the sums they pay for safety-enhancing products, such as seat belts and smoke detectors. Knowing these premiums and the risks associated with them makes it possible to calculate the “value of a statistical life”, which can then be used to place a value on changes in the risk of mortality.

Clearly, the task of determining empirically a price for small changes in mortality risk is challenging, if not heroic (and far more can be said in favour and against the approach than fits here). Nevertheless, many studies have now done so,⁴ inferring WTP for those small changes in mortality risk in labour markets or purchases of safety equipment. Others use an approach termed “contingent valuation methodology”, where survey respondents are asked how much they would pay to reduce their risk by a certain amount.

While WTP approaches have been refined and improved recently, considerable variation remains in the estimates obtained and considerable uncertainty (expressed as large confidence intervals) remains around any mean estimate. Caution is appropriate when using these estimates (and in using adequate sensitivity analysis), but this is no reason to abandon the quest for more accurate measurement of this very meaningful concept. It is reasonable to believe that further improvements in both methodologies and data sources will narrow the degree of uncertainty around the estimates.

These approaches were first developed when Usher (10) introduced the value of mortality reductions into national income accounting in 1973. He used the concept of “full income” to capture the sum of the value of growth in GDP and the value of years of life

2 The health-care inputs included in the measurement of GDP represent only a small share of the true value of health.

3 This refers to situations where people face marginal trade-offs between health and other goods, not the far less representative situation where people face immediate death, which would probably yield a willingness to pay whatever one has.

4 Viscusi & Aldy (9) present a review of such studies.

Table 1. Monetary value of life expectancy gains in selected European countries, 1970–2003

Country (1)	Life expectancy at birth (years)		Real GDP per capita (PPP\$)		Monetary value		
	1970 (2)	2003 (3)	1970 (4)	2003 (5)	Life expectancy gains (PPP\$) (6)	Gains per life year gained (PPP\$) (7)	(7) as % of 2003 GDP per capita (8)
Austria	70.02	78.93	3 020	30 094	87 986	9 875	33
Finland	70.40	78.72	2 897	27 619	74 037	8 899	32
France	72.93	79.44	3 659	27 677	54 741	8 409	30
Greece	73.82	78.93	1 613	19 954	29 085	5 692	29
Ireland	70.75	78.28	1 934	37 738	95 450	12 676	34
Netherlands	73.71	78.80	3 542	29 371	45 426	8 925	30
Norway	74.17	79.71	3 015	37 670	64 398	11 624	31
Spain	72.88	79.78	2 313	22 391	45 312	6 567	29
Sweden	74.83	80.37	4 019	26 750	42 705	7 708	29
Switzerland	73.24	80.81	5 222	30 552	69 794	9 220	30
Turkey	54.15	68.70	927	6 772	37 796	2 598	38
United Kingdom	71.95	78.45	3 189	27 147	55 106	8 478	31

Note. PPP\$ is purchasing power parity in US\$. Life expectancy and real GDP per capita data are from WHO European Health for All database (HFA-DB), version November 2007. Countries were chosen on the basis of data availability for both life expectancy and real GDP in 1970 and 2003.

expectancy gained. The initial study applied this concept to six political entities (Canada, Chile, France, Japan, Sri Lanka and Taiwan, China) and covered the middle decades of the 20th century. In the higher-income entities, about 30% of the growth in full income was attributable to declines in mortality. More recently, studying the United States, Nordhaus (11) found that the economic value of increases in longevity in the last century roughly equalled the growth measured in non-health goods and services.⁵

For our studies on Europe, we adopted the general approach used in the above cited work to estimate the monetary worth of increases in life expectancy between 1970 and 2003 in selected European countries.⁶ Conceptually, one can then measure the monetary value of health gains by the amount of money people would require to forego these gains. In other words, what income would someone living with a 2003 income and life expectancy require to be willing to live with the life expectancy that prevailed in 1970? The additional income he or she would require is a measure of the

monetary value of the additional life years gained between the two years.

Based on previously developed models (16, 17) and adopting the same, fairly standard assumptions and parameters from those models, we can specify utility functions for two hypothetical individuals born in 1970 and 2003. These models incorporate, among other factors, life expectancy and GDP per capita in the corresponding years. The calculations generating the value of the additional life years are somewhat tedious and are not reported here.⁷ The difference in lifetime values, and thus the required compensation, is in column 6 of Table 1. This value can then be divided by the extra years of life expectancy over the period (column 7) to yield an annual figure, and it can then be expressed in relation to 2003 GDP per capita in order to reveal its size (column 8). Varying between 29% and 38% of GDP per capita, these percentages illustrate the substantial value attributed to health gains in Europe, a value far exceeding each country's national health expenditures.

5 Costa & Kahn (12), Crafts (13), Cutler & Richardson (14), Miller, (15), and Viscusi & Aldy (9) had similar results.

6 We restrict ourselves to a verbal description of the idea behind our calculations. Presentations and discussions of its underlying model are in Becker, Philipson & Soares (16) and Soares (17). Details of our calculations are available on request.

7 In general, formal terms, the calculation is as follows: suppose the utility U of the hypothetical individual in the year 2003 depends on, among other factors not listed here, both life expectancy L and income Y in that year, so $U = U(L_{2003}, Y_{2003})$. The utility of the individual who has the same income but the life expectancy of 1970 would then be $U' = U(L_{1970}, Y_{2003} + a)$. To find out what the required income gain (a) is that would make the two individuals indifferent between the two situations, one just needs to equate U and U' and solve the equation for a . Of course this can only be done if we assume a very concrete shape of the utility function with concrete numerical parameters. This very concrete shape in the concrete numerical parameters is derived and justified in (16).

Table 2. The monetary value of life expectancy gains in selected CCEE-CIS countries, 1990–2003

Country (1)	Life expectancy at birth (years)		Real GDP per capita (PPP\$)		Monetary value		
	1970 (2)	2003 (3)	1970 (4)	2003 (5)	Life expectancy gains (PPP\$) (6)	Gains per life year gained (PPP\$) (7)	(7) as % of 2003 GDP per capita (8)
Albania	72.61	75.77	3 000	4 584	3 157	999	22
Armenia	72.08	73.08	4 741	3 671	777	777	21
Azerbaijan	71.35	71.93	3 529	3 617	454	783	22
Belarus	71.25	68.53	5 727	6 052	−4 329	1 592 ^a	26 ^a
Bulgaria	71.48	72.39	4 700	7 731	1 873	2 059	27
Czech Republic	71.53	75.4	11 531	16 357	18 978	4 904	30
Estonia	69.94	71.78	6 438	13 539	7 741	4 207	31
Georgia	72.97	72.00	4 572	2 588	−466	480 ^a	19 ^a
Kazakhstan	68.81	65.89	4 716	6 671	−5 658	1 938 ^a	29 ^a
Kyrgyzstan	68.82	67.91	3 520	1 751	−279	306 ^a	17 ^a
Latvia	69.54	70.95	6 457	10 270	4 331	3 072	30
Lithuania	71.55	72.24	4 913	11 702	2 353	3 410	29
Moldova	68.64	68.07	3 896	1 510	−139	243 ^a	16 ^a
Poland	71.01	74.74	4 900	11 379	12 088	3 241	28
Romania	69.79	71.32	2 800	7 277	3 053	1 996	27
Russian Federation	69.28	64.94	7 968	9 230	−12 559	2 894 ^a	31 ^a
Tajikistan	70.03	72.78	2 558	1 106	363	132	12
Ukraine	70.54	67.83	5 433	5 491	−3 894	1 437 ^a	26 ^a
Uzbekistan	69.71	70.36	3 115	1 744	189	290	17

^a Indicates a loss of welfare.

Table 2 presents the results of the same calculations for several of the countries in central and eastern Europe and the Commonwealth of Independent States (CCEE-CIS) for a much shorter period: 1990–2003. Data for both life expectancy and real GDP have only been available for an appreciable number of countries since 1990. As some countries experienced a decrease in life expectancy between 1990 and 2003, they are associated with negative amounts for the monetary value of health gains, which represent a welfare loss.

Clearly, this exercise is a somewhat simplified calculation of the welfare gains from longer life, and it ignores the additional welfare gains from reduced or postponed morbidity that would accompany the reduction in mortality. Ideally, the findings would be based on direct estimates derived from European WTP studies – rather than from data calibrated for a model – which is not yet

possible because of the scarcity of country-specific data. That said, the actual figures are unlikely to deviate much from the results suggested above, so if only a fraction of these life expectancy gains results from health interventions, the “true” social productivity of spending on health (via the health system and other sectors that affect health) may have been many times greater than that of other forms of investment.

3. Limited perspective: micro- and macroeconomic costs

In this section we look at two more-tangible but less-holistic types of economic consequences that differ from each other in perspective: those that affect individual and household economies (microeconomic consequences) and those that affect national economies (macroeconomic consequences).⁸ The former are

⁸ We are not discussing “cost-of-illness” (COI) studies, mainly for lack of space but also for reservations about how they are commonly carried out. Much like in our cost categorization, such studies distinguish three categories of COI: direct costs (mainly medical care), indirect costs (largely due to foregone labour productivity) and intangible (that is, psychological) costs, with the last rarely measured. Despite this simple categorization, COI studies differ enormously in how and what they actually measure. A review of COI studies and some critical evaluation are in section 3.1 of Suhrcke et al. (18) and section 3.2 of Suhrcke et al. (2).

important for individuals, most of whom may be unaware of the extent to which avoidable ill health affects different dimensions of their economic well-being. The latter hold promise for policy-makers – especially those outside the health sector, particularly in finance ministries. Understanding macroeconomic consequences and their causes may encourage policy-makers to consider investment in health as one way (of several) to achieve their economic objectives.

Before discussing the findings of research on these types of consequences and how they are examined through research, we present a simple framework showing how, in principle, health might affect economic outcomes. This “how” can be expressed as an aggregate production:

$$Y = A F(K, hL)$$

where Y is output or GDP, A is “total factor productivity” (TFP),⁹ $F(\cdot)$ is a production function, K is physical capital, L is labour, and h is the quality of labour or human capital.

Put simply, GDP grows only with increases in the *level of TFP* (A), in the *aggregate level of physical capital* (K) and/or the *quality or quantity of labour* (hL). Hence, if health is to affect economic output, it has to affect one or more of these factors. How this could in principle happen is as follows.

Healthier individuals could reasonably be expected to display *greater labour productivity*: to produce more output per hour worked. On the one hand, their productivity could be increased by their enhanced physical and mental activity. On the other, more physically and mentally active individuals could make better and more efficient use of technology, machinery and equipment (19). Labour productivity is typically measured by wages and/or earnings.¹⁰ Wages or earnings may also differ between individuals with different health conditions as a result of discrimination, entirely unrelated to reasons of productivity.

Somewhat counterintuitively, economic theory predicts an ambiguous impact of health on *labour supply*. The ambiguity results from two effects that may offset each other. If poor health reduces wages through lower productivity, workers might compensate for the lower economic return on their time by taking more leisure (substitution effect): they derive more value from leisure than income. On the other hand, falling wages over their lifetimes could push individuals to work more hours or years (income effect). Which effect becomes

more important in a given set of circumstances thereby becomes an empirical question (19).

Human capital theory suggests that people with more and better *education* will be more productive (and obtain higher earnings). If children attain higher educational status, lose less time from school, and are less likely to drop out because of better health, then improved health in youth would increase future productivity. Moreover, as improved health leads to longer life, healthier individuals will have more incentive to invest in their education and training, as they will be able to harvest the associated benefits for a longer period (20).

Returning to the production function, health can, in principle, also have a direct effect on *TFP*. The aggregate productivity of an economy depends, among other things, on the business and research activities that citizens undertake. Evidence suggests that ill health status can negatively affect these decisions (21), although more empirical work is needed. It has also been suggested that significant benefits from investment in health-related research and development (R&D) can spill over to the larger economy (Box 1).

At an individual or population level, health may affect not just income, but also how it is used, whether for consumption, savings or investment. Healthier individuals can reasonably expect to live longer and to have a longer time horizon. Their propensity to save for the future may be higher than that of individuals in poor health. A healthy workforce can also increase the incentive for business investment. And high health-care costs can also drive a household to sell productive assets, thereby exposing it to a greater poverty risk. In sum, a population experiencing a rapid increase in life expectancy may be expected – other things being equal – to save and invest more. This should also contribute to the likelihood of investing in *physical capital* (27).

3.1 Microeconomic costs

In this section we examine the microeconomic impact of health on the labour market – as a potential determinant of earnings and of various indicators of labour supply. The labour market is unarguably a key determinant of economic performance at micro and macro levels. Lower labour productivity and labour supply are recognized as among the prime reasons why Europe’s economy lags behind that of the United States. We focus on the labour market because this is where most empirical findings have been accumulated, due in part to the

9 Growth in TFP, also called the “Solow residual”, represents output growth not accounted for by the growth in the other relevant inputs (here labour and physical capital). TFP is a measure of how efficiently all inputs combined are used in a production process. Technology, monetary shocks and the political system all affect TFP.

10 We use the terms “wages” and “earnings” interchangeably here, although strictly speaking there is a difference: the wage rate is the price of one unit of labour (for instance, hour), while earnings comprise an individual’s entire income from labour over a period of time, often a year.

Box 1. Health-related R&D and its contribution to the broader economy

The health sector creates intensive demands for research and development (R&D): in 2003, 19.5% of domestic R&D expenditure by government and higher education sectors in the countries that were members of the European Union (EU) from 1 May 2004 to 1 January 2007 (EU25) was in medical sciences (22). This rate was exceeded only by natural sciences (34%) and engineering and technology (23%). Economists widely agree that investment in R&D contributes to economic growth (via its impact on TFP).

Looking at R&D in general, research has documented spillovers of R&D expenditure beyond the firm, industry or country where the R&D took place (23,24). "Spillover" refers to "the impact of the discovered ideas or compounds on the productivity of the research endeavours of others" (23). Many developed countries have an explicit policy goal of increasing R&D expenditures. In fact, the EU's revised Lisbon agenda has the goal of reaching an R&D level of 3% of GDP by 2010. By analogy, it could be argued that R&D in the health sector could spill over to other productive sectors in an economy, contributing to its wider productivity. If true, this spillover advantage from health-related R&D could benefit an economy even if it failed to improve health.

Evidence from other sectors suggests that such a possibility seems highly plausible. To-date, however, evidence is scant that health-related R&D has economy-wide benefits in Europe or globally. One exception is a study involving the United States, which estimated that just 10 biomedical discoveries derived from publicly sponsored health research, and adopted by industry for purposes other than health services, generated an additional US\$ 92 billion (€57 billion) annually (25). Another study indicates the considerable applications of biotechnology in non-health sectors (for example, developments in plant genetics and food production, using bacteria to clean up oil spills and organic compounds with novel industrial applications) may also reflect the economy-wide impact of health-related R&D (26). Nevertheless, more research examining the extent to which health-related R&D benefits productivity at large, in particular in Europe, would be worthwhile.

nature of existing datasets. However, this focus should not be seen as devaluing other microeconomic channels. A brief discussion of health's impact on education and savings was published earlier (2).

Over the last two to three years, evidence on the labour market consequences of health has grown significantly, albeit from a low base. Most of this new research focuses on individual countries, although the European Community Household Panel (ECHP) and the more recent Survey on Health, Ageing and Retirement in Europe (SHARE) enable important new cross-country analyses in Europe. Considerable microeconomic findings from research are now also available for the eastern European countries (3,28). Research into the labour market consequences of health falls into two

Box 2. Methodological challenges in assessing the causal impact of health on the labour market and attempted solutions

At least three methodological challenges complicate measuring the extent to which health affects income: first, it is plausible that the relationship between health and employment or earnings acts in both directions: health may affect employment, and employment may affect health. Such bidirectional causality creates problems for the most common econometric technique for this assessment, ordinary least squares (OLS) estimation. Second, health measurement is subject to systematic bias, especially when self-assessed. Third, available datasets may exclude crucial variables (such as individual preferences on time and risk), either because they were not investigated or are unobservable. The studies reviewed here have generally tried to address one or more of these challenges.

Most work in this area uses cross-sectional data and employs various forms of instrumental variable techniques. These techniques require finding valid instruments that are uncorrelated with the error term and predict well the endogenous variables for each equation. Some studies use panel data, allowing the application of, for instance, different versions of fixed and random effects models. Others use OLS estimation, defending doing so by assuming (or testing – to some extent – for) the exogeneity of the health measure.¹¹

categories, one examining the impact of health indicators (for example, chronic illness) and the other the impact of risk factors (for example, smoking). The former is the main focus here (but see Box 3 below). Most, but not all studies confirm the theoretical prediction that ill health will lower earnings. While definitional and methodological differences among studies lead to quite different estimates of the size of the impact, gaining some idea of its magnitude is possible.

More studies have examined the effect of health on labour supply, especially among older workers, presumably because it is easier to measure employment than earnings in household surveys. (A few look at earnings and supply simultaneously.) This type of research must overcome some methodological challenges (Box 2).

3.1.1 Health as a determinant of earnings

True labour productivity is relatively easy to measure in economies where the output derives from manual work, such as agriculture and mining. While more difficult to measure in economies where the output derives from non-manual work, in a competitive market, the wage rate should equal marginal productivity, so that rate is typically used as a proxy for productivity.¹²

To the best of our knowledge, the only study that examined the impact of ill health on earnings using a

¹¹ Jones presents a discussion and practical illustration of these concepts and their applications (29).

¹² Based on the New Keynesian theory of downward-rigid or "sticky" wages, the wage rate can correctly be used as a proxy for productivity only above a minimum level. Below that level, wages are unrelated to actual productivity (30).

European multi-country survey is Gambin's 2005 discussion paper (31), although her primary interest was in health's potential differential impact on wages by gender. Using the eight waves of the ECHP covering 1994–2001 for 14 European countries, she found somewhat mixed results: overall, relationships were significant more often for men than women. For both sexes, she obtained the most significant coefficients through pooled OLS rather than through random effects (RE) or fixed effects (FE) estimation. This suggests that the associations she observed may not be due to the impact of health on wages but rather the reverse.

Other single-country studies, often using national surveys that were part of the ECHP, find more robust impacts of health on earnings/wages. For instance, one study examined how self-assessed general and psychological health affected hourly wages – separately for males and females – by using longitudinal data from six waves of the British Household Panel Survey (32). The results suggest that poorer “psychological health” – a variable the authors defined – leads to a decrease in hourly wages for males, while excellent self-assessed health increases hourly wages for females.¹³

Jäckle used the German Socioeconomic Panel (GSOEP) covering 1995–2005 to estimate men's and women's reduced-form wage equations augmented by a variable measuring health satisfaction (36). He found that good health raised wages: a 10% increase in health satisfaction enhanced women's (hourly) wages by approximately 0.14–0.47% and men's about 0.09–0.88%.¹⁴

Lechner & Vazquez-Alvarez used data from the same survey and for the years covering 1984–2001 (39). Applying a matching model, they compared groups of people who were disabled and those who were not; both groups were the same in other variables. They found that non-disabled people earn as much as DM 6200 (€3100) more annually than those with one definition of disability and as much as DM 10 700

13 The authors employ single-equation FE and RE instrumental variable estimators suggested by others (33–35).

14 In an attempt to control for unobserved heterogeneity, sample selection and endogeneity, the GSOEP work applied estimators proposed previously (37,38). Due to the panel structure of the data, it is possible to control for unobserved effects. A number of tests provide evidence that, for the male sample, corrections are needed, while this issue causes no problems in the female population.

15 An exception is the recent Global Progress Report on Vitamin and Mineral Deficiency (43), which gives some quantitative idea of the economic costs associated with micronutrient deficiencies in 80 low- and middle-income countries in central Asia and the Caucasus, including some CCEE-CIS. Those estimates do not, however, appear to be based on the kind of labour market studies described here.

Box 3. The labour market impact of risk factors

Several studies have explored the impact of risk factors on labour market outcomes. The risk factors include under- and over-nutrition, smoking and alcohol consumption. There is considerable literature showing the harmful effects of mal- or under-nutrition on labour market (and broader economic) outcomes worldwide (1,40,41) and in the CCEE-CIS (42), although typically there are no direct cost estimates for the CCEE-CIS.¹⁵ Surprisingly few studies have examined the labour market impact of smoking. The study by Levine, Gustafson & Valenchik is a rare exception, finding that workers with otherwise typical characteristics and who smoke earn 4–8% less than non-smokers (44). In what appears to be a rare exception of a study on smokers in low- and middle-income countries, Lokshin & Beegle found that Albanian smokers experienced wage reductions of 21–28% (45).

Several studies examine simultaneous effects of smoking and drinking (46–49). One found that in The Netherlands alcohol use was associated with 10% higher wages for males while smoking reduced them by about 10% (the study found no effects of either in females) (49). Several other studies confirm the somewhat counterintuitive, positive wage impact of alcohol consumption. One explanation is the beneficial health effects of moderate alcohol consumption, although it fails to consider either the very harmful health effects of excessive alcohol consumption or the absence of beneficial health effects in younger people who have little risk of cardiovascular diseases (CVD). Another explanation is alcohol consumed during social networking, where it is hypothesized that such consumption is associated with additional social time spent with colleagues and associates. This practice may signal more senior staff that the individual is more motivated and committed to the firm, inducing higher wages for the individual. During such networking, workers may learn valuable information that boosts their careers and ultimately their wages (50). Some refute this hypothesis, arguing that the observed results are largely due to measurement problems. For instance, two studies showed that binge drinking reduced earnings among males and females in the United States (51,52). Other studies also report an adverse impact of excessive alcohol consumption on employment. Using Finnish data, one demonstrated that alcohol dependence reduced the probability that a man (woman) would be in full- or part-time work by around 14 (11) percentage points (53) (see also (54)).

A relatively new but fast growing area of research focuses on the impact of obesity on the labour market, initially in the United States (55,56) but recently also in (western) Europe. In theory, being overweight should have effects similar to more general health variables on labour market outcomes, simply because of the adverse impact of obesity on health. However, employers may also discriminate against obese job seekers or workers by offering fewer chances for employment or lower wages. Most empirical studies calculate the overall impact on labour market outcomes, without seeking to disentangle any discrimination effect from a productivity effect.

Overall, considerable evidence suggests an adverse impact of obesity on labour market outcomes, but some studies conclude otherwise. If obesity has a negative impact on wages or labour participation and supply, it is clearly more pronounced among women than men. More work is needed to better explain why results vary among studies and countries, the interplay with labour market institutions and the very complex nature of the relationship between obesity and socioeconomic factors. There is some indication that some of the differences result from the imperfect measures used as a proxy for “fatness” (57).

(€5350) more than those with more severe disability. This statistically significant difference represents an earnings gap of approximately 16% and 20%, respectively. The difference, measured as per capita disposable household income, is less but still significant, with at most a gap of DM 2500 (€1250).

Turning to eastern Europe, we recently analysed the potential impact of health on wages in the Russian Federation (3). We used both cross-sectional analyses of successive waves of the Russian Longitudinal Monitoring Survey (RLMS) and the much larger but one-off household survey, National Survey of Household Welfare and Program Participation (NOBUS). We applied both an instrumental variable estimate and longitudinal analyses, taking advantage of the panel dimension of the RLMS.

In the RLMS analysis, we used, respectively, individual self-reported health status and the reported number of workdays missed due to illness as a proxy for health. In both cases we used medically diagnosed diseases to instrument for self-reported health indicators. Good health (compared to less than good health) was found to increase the wage rate by 22% for women and 18% for men. Similarly, a workday missed due to illness reduced the wage rate by 3.7% for men and by 5.5% for women.¹⁶

With the NOBUS data,¹⁷ we used self-reported health status as a proxy for health, as in the RLMS analysis, confirming the impact of health on wages. Men in good health earned about 30% more than those in fair, bad and very bad health, while women in good health earned 18% more than women in less good health.

3.1.2 Health as a determinant of labour supply

As noted, more research exists on the impact of health on various indicators of labour supply than on wages/earnings. This may be because, given the nature of the labour market in most European countries, wages poorly reflect individual productivity. Moreover, earnings are subject to greater misreporting and non-reporting.

We have also noted how the theoretical impact of health on labour supply is ambiguous. Overall though, most studies find that ill health reduces labour supply, measured by, for example, labour force participation or hours worked. Much of the research findings relate to labour force participation by people over 50. This is particularly relevant given that low rates of labour force participation, especially among older workers in Europe,

are one key factor behind Europe's sluggish economic performance compared to that of the United States. Here, we first review selected studies on the impact of health on labour force participation in general before dedicating a subsection to the role of health in affecting retirement decisions.

Health and labour supply in the general working age population

Many studies using panel data to examine labour supply look not only at health at one point in time but also sudden, negative changes in health status ("health shocks"). To the extent that they occur unexpectedly, they are particularly good at capturing the exogenous variation in health, which is very helpful when trying to assess whether changes in health cause changes in economic variables, undisturbed by reverse causality or omitted variables.

García Gómez examined the impact that health shocks have on the probability of being employed in nine European countries (58). She used the ECHP and applied a matching technique combined with difference-in-differences techniques. Her results suggest that the direction of causality is indeed from health to probability of employment and then to income: individuals who suffered a health shock were significantly more likely to leave employment, and in several countries doing so was associated with a significant reduction in some types of income. As expected, the magnitude and the significance of the income declines differed across countries. Three (France, Italy and Greece) registered no significant effect, while in Denmark, The Netherlands and Ireland, which had the largest effects, a health shock reduced income by more than 7%. This considerable percentage largely relates to the fact that a health shock more than doubled the chance of being unemployed. The differences among countries likely reflect different incentives set by the social security arrangements in place: in Ireland, for instance, individuals who experience a health deterioration cannot even opt to work part-time if they want to be entitled to disability benefits.

The Lechner & Vazquez-Alvarez study analysed the impact of becoming disabled in Germany on the probability of being employed and found that becoming disabled reduced the probability of being employed by almost 10% (39). It also looked at a subsample of those in full-time work at the start of the survey. One might

¹⁶ We complemented the cross-sectional analysis with panel analysis to check the robustness of our findings. In general we found that the effect of health on wages continued to hold for males, although the effect was smaller: being in good health increased the wage rate by about 7.5%. Surprisingly, good health did not affect either wage rate or labour supply among female workers, unlike what appears in the cross-sectional instrumental variables estimations, where the effect on female wage rates was even larger than it was on men's.

¹⁷ While the RLMS has certain advantages, in particular the annual waves that allow comparison over time, NOBUS, so far only held once (in 2003), covered a far larger share of the population. Its health component was, however, very small compared to that in the RLMS, so a direct comparison between RLMS and NOBUS results is not possible.

expect that those who become disabled would be better informed about disability policies and the labour market and therefore would be less at risk of unemployment than the overall sample. In fact, there was almost no difference.

Using Irish panel data covering 1995–2000, Gannon found – using a pooled dynamic probit model – that disabled men whose activities were severely limited were nine percentage points less likely to be working than non-disabled men (59). The corresponding figure for women was 26 percentage points. The effects of some and no limitations turn out to be less substantial.

Our study of eastern Europe and central Asia looked at, among other issues, how poor self-reported health and limited activity affected the probability of being employed in eight CIS countries. This was based on the unique (for the CIS) Living Standards, Lifestyles and Health survey, and we applied an instrumental variable estimation (3). The survey was performed only once, in 2001, but will be repeated in 2009. Table 3 shows how limitations in daily activities affected labour market participation. The variable was dichotomous: limited activity was either present or absent. The expected negative impact of ill health (here the proxy was activity limitations) on economic outcomes was confirmed in all surveyed countries. In Georgia the probability that individuals whose activities were limited would participate in the labour market was at least 6.9% lower than for individuals without such limitations. This rose to 30.4% in Kazakhstan.

A similar exercise found, on the basis of a cross-sectional and panel analysis of the Bulgarian Living Standard Measurement Surveys in 1995, 1997 and 2001, that disability reduced the probability of being employed, but labour supply, in turn, had little effect on disability (60). The study employed a simultaneous equation model (health and employment equations) estimated separately via maximum-likelihood methods in each of the three years, as well as a simultaneous equation model on the available panel data (1995 and 1997).

Health and the labour supply of older workers: the impact of health on retirement

There is now considerable evidence that ill health plays a significant and robust role in the decision to retire. Much of the earlier research was carried out in the United States, but work and findings from Europe are increasing.

Table 3. The impact of activity limitations on labour market participation in eight CIS countries (in %), 2001

Country	Change in probability of labour market participation due to presence of activity limitation (%)
Armenia	-16.3 ^a
Belarus	-25.1 ^a
Georgia	-6.9 ^b
Kazakhstan	-30.4 ^a
Kyrgyzstan	-18.8 ^a
Moldova	-22.3 ^a
Russian Federation	-23.0 ^a
Ukraine	-16.7 ^a

^a Significant at 1%. ^b Significant at 5%.

Source: Suhrcke, Rocco & McKee (3).

Several reviews have concluded that the evidence is sufficient to state that poor health and negative health shocks increase the probability of retiring in high-income countries (19,61–63). Health status even emerges as the main – but of course not the sole¹⁸ – determinant of labour supply by older workers in several studies. We review some recent empirical studies on Europe but caution that when interpreting the results from different countries and time periods, it is essential to be aware that results are sensitive to different institutional frameworks (such as pension rules, availability of disability benefits and health insurance coverage).

Hagan, Jones and Rice found that health exerted a significant and strong impact on the probability of retiring, all else being equal (65). They used data from nine countries (Belgium, Denmark, France, Greece, Ireland, Italy, Portugal, Spain and the United Kingdom) covered by the ECHP for 1994–2001, with a sample of individuals aged 50–64 and either employed or self-employed in 1994. They used alternative definitions of retirement (self-reported or based on the transition from activity to inactivity¹⁹) and alternative measures of health (self-assessed health, limitations due to ill health,

18 An important factor in the decision to retire is an individual's financial incentives, determined largely by the characteristics of the country's pension and social protection system (for example, (64)).

19 The self-reported version was based on the self-classification of respondents as “retired”, as 1 out of 12 options for their activity status. The second, broader variable used the transition between reported activity in the labour market and inactivity as a measure of retirement. This was chosen because of doubts raised about the accuracy of the self-reported “retired” and because transitions from activity to inactivity have been used frequently as outcome measures in analysing the effect of health on retirement. Retirement was taken as an absorbing or permanent state, so individuals were followed from work to when they first reported retirement, and any subsequent transition back to work was disregarded (65).

Table 4. Change in the probability of retiring due to a one-unit change in the health measure (pooled results), in percentages

Health measures contributing to the decision to retire	Effect on two indicators of retirement (%)	
	Self-reported retirement	Transition to inactivity
Self-assessed health	-15 ^a	-18 ^a
No limitation due to ill health	-25 ^a	-30 ^a
Health stock	-13 ^a	-17 ^a
Health shock:		
small	0	+14
medium	+44 ^a	+50 ^a
large	+47 ^a	+106 ^a

^a Significance at 1% level. The normalized variable "health stock" has a mean of 0 and a standard variation of 1.

Source: Hagan, Jones & Rice (65).

a constructed health status measure and a measure of health shocks). They found a consistent effect of health status on retirement decisions. Acute health shocks were more important than poor health per se. Pooling data from all countries revealed that a medium health shock would, all else being equal, increase the probability of retiring by 50%, while a large one would increase it by 106% (Table 4).

Hagan, Jones & Rice also looked at how the impact of health shocks and health stocks varied among countries, variation that may be associated with the incentives for retirement embedded in a country's social security and tax systems (65). Despite the cross-country variation, the fundamental results from the pooled analysis presented above did hold through.

Kalwij & Vermeulen produced a similar cross-country analysis, using data collected in 2004 for 11 countries in the European SHARE survey (66). In contrast to the ECHP data used by Hagan and colleagues, SHARE covered only one point in time: panel data were not available.²⁰ On the other hand, SHARE focuses on those over 50 and has a more extensive collection of health indicators, many of them objective and not subject to the measurement bias commonly associated with the standard self-reported health variables. This makes SHARE particularly suitable for examining how health

affects labour force participation by the elderly.

They found that several health indicators were significantly associated with the probability that men and women aged 50–64 would participate in the labour force (66).²¹ They estimated the decision of working/not working separately for each country and for men and women. They used five health variables: maximum grip strength and whether or not the individual ever had a severe or a mild condition, suffered from restrictions in activities of daily living or was obese. Only in France, Greece and Switzerland did none of the health variables significantly affect the probability that men would participate in the labour force, while this was only true for women in Austria.²² To illustrate the statistically significant results: having ever suffered a severe condition significantly lowered the probability of women's participation in the labour force in four countries by 11–28 percentage points, while for men the range in five countries was 13–31 percentage points.

A series of country-specific analyses also confirmed that health affects retirement decisions. Most of the evidence is from western European countries, such as research by Kerkhofs, Lindeboom & Theeuwes (67) and Lindeboom & Kerkhofs (68), who used panel data from The Netherlands. Roberts et al., using comparable

20 The second round of SHARE, fielded in 2006 and 2007, was released in early 2008 (<http://www.share-project.org>; accessed 2 April 2008).

21 The countries covered were: Austria, Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands, Spain, Sweden and Switzerland. Data for the first wave were collected in 2004, except in Belgium and France, where they were gathered in 2004–2005.

22 The authors do not address the potential endogeneity problem but rather assume that the health indicators they employed are exogenous to labour market participation, thereby justifying the single equation probit they used, a decision further justified by the more objective nature of the health indicators available in SHARE.

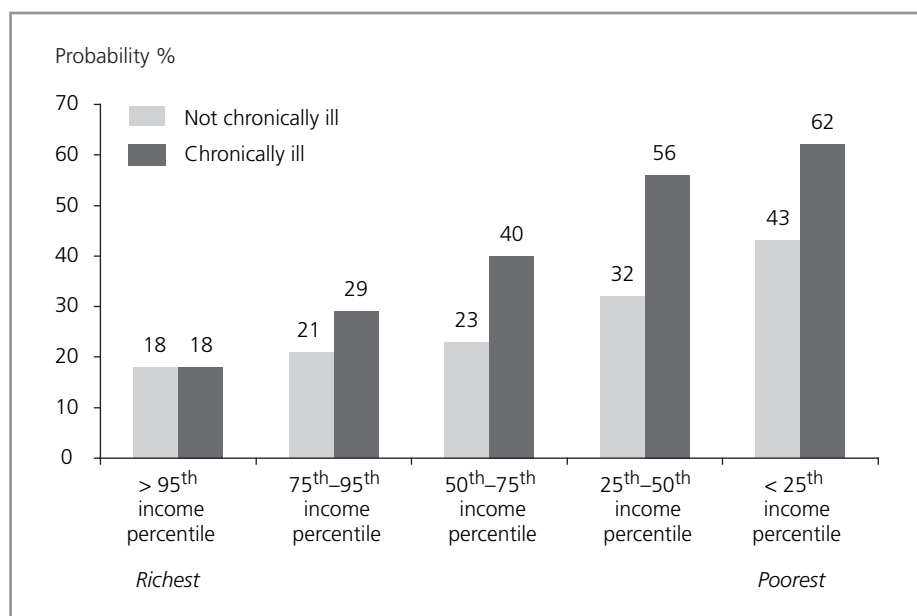


Fig. 2. Average predicted probability of retiring in the subsequent period (in %), based on panel logit results

Note. Results refer to a hypothetical male at age 55 (3).

Source: Suhrcke, Rocco & McKee (3).

longitudinal data sets for the period 1991–2002, found health to be the key determinant of whether someone would retire in Germany and the United Kingdom (69). Using the same British data, Disney et al. found robust evidence that health deteriorations increased the probability that older people would transition from economic activity to inactivity (70). They also found that the impact of deterioration and improvement in health was asymmetrical, with a deterioration in health having a larger negative effect than the positive effect associated with a health improvement of similar magnitude. Siddiqui used longitudinal data from West Germany to show that being disabled or suffering from a chronic disease significantly increased the probability of early retirement (71). Using Spanish survey data from 1999, Jiménez-Martin, Labeaga & Vilaplana Prieto found that (self-reported) ill health and disability shocks significantly affected the probability that older workers would continue working (72). Using a Danish Longitudinal Register database for 1991–2001 and medical data from the Danish National Patient Registry, Datta Gupta & Larsen found that men aged 50–69 were 8% more likely to retire two years after suffering an acute health shock (heart attack, stroke or incident cancer) (73).

The relationship between health and retirement has been the subject of less research in central and eastern European countries, though some recent work has been undertaken for the Russian Federation (3); for Albania, Bosnia and Herzegovina and Bulgaria (74); and for Estonia (18). These studies confirm that the impact of ill health on retirement is not restricted to western Europe. Ill health emerged as an important factor in anticipating the decision to retire in all these countries. In Estonia, for instance, ill health increased the probability that a man

would retire in the following year by 6.4% compared to one without a chronic illness or disability. For women the corresponding figure was 5.6%.

The study on the three south-eastern European countries found a particularly strong effect in Albania, although precise cross-country comparisons cannot be made because of differences in the data. In the Russian Federation, we examined how chronic illness affected the probability of retiring in the subsequent year. An individual who suffers from chronic illness has a significantly higher probability of retiring in the subsequent year than the same individual free of chronic illness (Fig. 2). The magnitude of effect is sizeable compared to other variables in the model. Interestingly, as the figure shows, the impact of health on retirement is particularly strong among the poor, suggesting that existing economic disadvantage may be perpetuated through ill health.

In summary, increasing research from Europe indicates that poor health and, in particular, sudden deteriorations in health, lead to earlier retirement.

3.2 Macroeconomic costs

The previous sections showed how better health is good for the economic status of individuals. Is the same true for entire countries? This section reviews what is known, with a particular focus on research of greatest relevance to the countries of the European Region. It does not look in detail at the ways by which scourges such as HIV/AIDS and malaria may impede economic growth in many countries. Specific work is available on malaria (75), HIV/AIDS (76) and malnutrition (77).

The evidence on whether better health contributes to economic growth in countries in the WHO European

Region is rather mixed. While there are grounds for optimism, the answer depends on at least two factors. The first is the country's economic and health status: where both are high, the scope for gains is limited, simply as a consequence of the law of diminishing returns. The second is the existing institutional setting: where retirement age is fixed and low, it curbs the effect of better health on the economy. Each is considered in turn.

3.2.1 Does health determine economic growth?

Historical studies show that much of today's economic wealth can be attributed to historical health gains. For example, estimates indicate that about 50% of the economic growth experienced by the United Kingdom between 1780 and 1980 can be attributed to improved health and nutrition (78). Another study of 10 industrialized countries over periods of at least a century found improvements in health had increased the rate of economic growth by 30–40% (79).

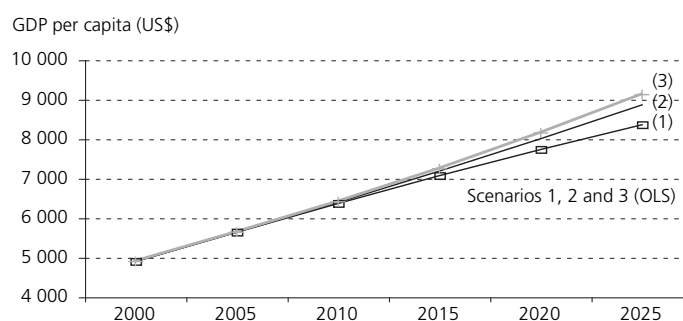
Findings from cross-sectional studies are less straightforward, with results differing according to whether the study looked worldwide or focused on high-income countries. Worldwide studies consistently find that health is a robust predictor of economic growth, acting through increased savings (25), investment in human capital (80), labour market participation (1), foreign direct investment (81) and productivity growth (82). Although these studies cover different countries and periods and use different variables, data definitions and models, the conclusions are remarkably consistent (83,84). Health status emerges as a strong predictor of subsequent economic growth, in some cases having more impact than education (85). These findings can be used to predict the future trajectory of per capita income in a country should it achieve a defined reduction in mortality. The outcome of such an exercise in five low- and middle-income CCEE-CIS indicates potentially large income gains (3) (Box 4).

A notable counter-perspective, however, was recently provided by Acemoglu & Johnson (86) and Ashraf et al. (87), although their focus was on developing

Box 4. A simple calculation of the potential growth impact of reducing future adult mortality rates in five CCEE-CIS

Suhrcke et al. start with a parsimonious cross-country growth regression for the period 1960–2000 to establish a baseline of how adult mortality, conditional on some relevant determinants of economic growth (that is, initial per capita income, fertility rates, and the economy's openness) relates to future per capita incomes (3). We then assumed that this relationship would also govern the relationship between adult mortality and per capita incomes in five countries: Georgia, Kazakhstan, Lithuania, Romania and the Russian Federation. In the absence of pre-existing country-specific results on the role of health in economic growth, this assumption may be a defensible first step. We postulated three simple future scenarios for adult mortality rates from 2000 to 2025: (1) no change, (2) a 2% per annum reduction and (3) a 3% per annum reduction. This provided three different scenarios for the future path of per-capita incomes, as illustrated in Fig. 3 for the representative case of Georgia.

Fig. 3. GDP per capita forecasts based on OLS estimates, in three scenarios, Georgia



Source: Suhrcke, Rocco & McKee (3).

The total discounted benefits of the intermediate and optimistic scenarios, compared to the benchmark scenario, can then be calculated. Table 5 shows the results for the five countries, using two different regression approaches: an OLS and an FE regression. As expected, the FE estimates produce a steeper growth path than the OLS estimates, and the "true" effect will lie somewhere in between.

Table 5. Summary of discounted benefits as a share of (2000) GDP per capita in five countries

Country	2% per annum reduction in adult mortality rate (%)		3% per annum reduction in adult mortality rate (%)		GDP per capita (US\$)
	OLS	FE	OLS	FE	
Georgia	40	126	62	194	4904
Kazakhstan	26	58	40	88	7394
Lithuania	30	77	46	118	7242
Romania	40	129	61	198	4287
Russian Federation	26	62	39	95	8013

Notes. Amounts are the discounted (at 3% per year) gain from reducing adult mortality, keeping fertility rate constant at 2000 level; measured with respect to the 2000 GDP per capita in percentage terms.

These results, even though they should be taken with great caution in light of the simplified methodology, suggest that the total discounted benefit, even of the relatively modest second scenario, measured by the more conservative estimation methodology (OLS), are substantial when expressed in terms of 2000 GDP. The benefits vary between 26% for the Russian Federation and Kazakhstan and 40% for Georgia and Romania.

countries. While the former undertook particular efforts to deal with the problem of omitted variable bias and reverse causality in their extensive regression analysis, the latter built a simulation model starting from the microeconomic level.

Few of these models consider whether returns from health gains diminish once a particular level of national wealth is achieved, but Bhargava et al. and Jamison et al. (88,89) suggest they do diminish. Consequently, worldwide samples may not sufficiently inform thinking about high-income countries in Europe. Three studies used health expenditures as a proxy for health in Organisation for Economic Co-operation and Development (OECD) countries and found a positive association between health expenditure and economic growth or income levels (90–92). These results are intriguing, especially since expenditure on health emerges as substantially more important than that on education in explaining economic growth.²³ Two studies looked at a sample of 22 developed countries between 1960 and 1985 and found that health – measured by life expectancy – had no significant impact on economic growth (95) or on per capita income levels (96). Does this mean that, above a certain level of economic development, further health gains may either have no impact or even reduce subsequent economic growth?

Closer inspection indicates that this is not necessarily the case. The most plausible explanation for these negative findings is that they may be due to artefact. Life expectancies now differ relatively little among rich countries, unlike among poor countries, so life expectancy's lack of explanatory power comes as no surprise (97). Research in rich countries necessitates the use of health indicators that can better discriminate levels of health.

This direction was taken in another recent study (98). In an analysis of 26 rich countries covering 1960–2000, cardiovascular mortality in the working-age population emerged as a robust, inverse predictor of subsequent economic growth. In one representative estimate, a 10% reduction in cardiovascular mortality was associated with a one percentage point increase in growth of per capita income, a seemingly small amount but one that has a large effect when summed over the long term.

Another explanation of why some of the earlier studies found few macroeconomic benefits from better health may be that prevailing institutional factors constrain what could be achieved. This is the case where health gains increase the proportion of a population beyond retirement age – a point taken up in the following

subsection. The discussion will explain that if effective retirement age can be delayed in step with longevity gains, many of the negative economic consequences commonly ascribed to ageing societies could be mitigated. In other words, increasing the retirement age might allow health to finally “deliver” its positive impact on the labour market and thus on the economy by keeping more and healthier people in the workforce as they age.

When evaluating the macroeconomic findings from these cross-country regression studies, it is important to bear in mind the general limits of this approach, whether health is included in the list of determinants or not. It is particularly important not to overstate the possibility of drawing country-specific lessons (99).

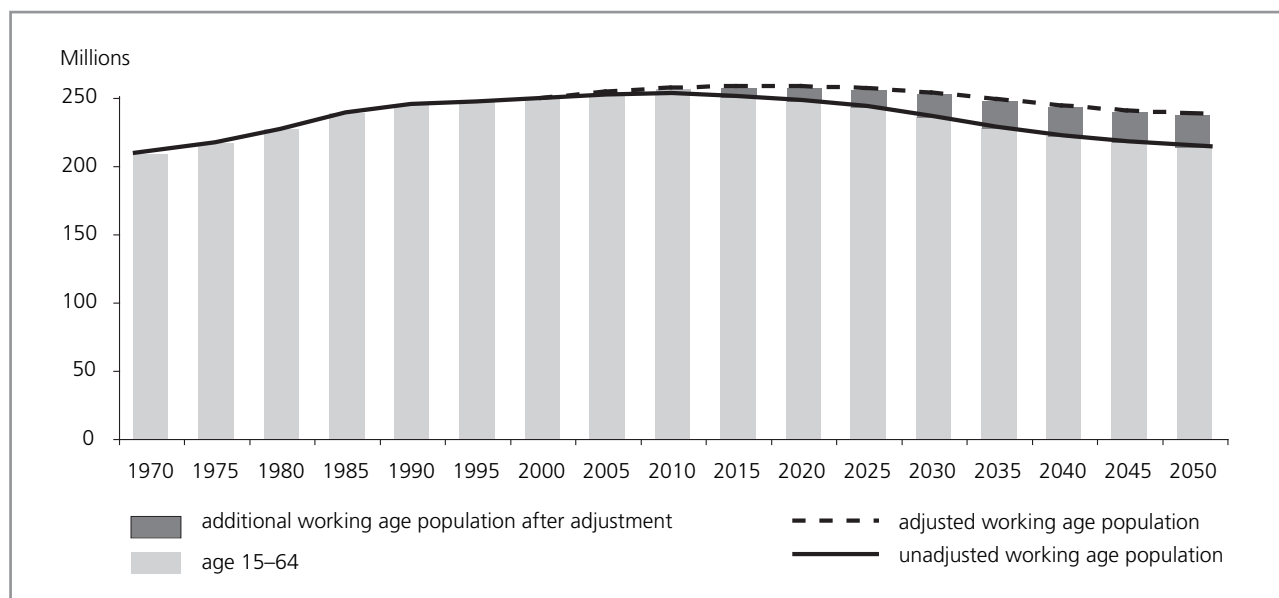
3.2.2 Potential impact of longevity on the size of the labour force

We hypothesized earlier that one reason why some studies have not found that life expectancy positively affects economic growth in high-income countries may be that the retirement age is fixed at a level far younger than average life expectancy. If so, improved population health could at best make only a little difference to the health, and hence to the productivity and labour supply, of the working-age population. Instead, it adds to the pool of retired people – probably desirable from a welfare perspective, but a shrinking labour force and expanding population of elderly dependents will cause difficulties in sustaining economic growth and maintaining a fiscal balance. In 2003, OECD researchers forecast that, with unchanged labour market and immigration conditions, the labour force in the countries belonging to the EU before May 2004 (EU15) could decline by around 14% (25 million workers) by 2050 compared to the 2010 peak. This is more favourable than in Japan, where the labour force has already started this decline, but it is still far from the United States benchmark where the labour force is projected to continue increasing, by about 26% (37 million workers) between 2005 and 2050 (100).

What policy implications flow from these findings in Europe? If people live longer, it may not be entirely outrageous to ask them to work longer. Increasing the effective retirement age (which has stalled or even declined in past decades) is an obvious means of averting at least part of the future labour force decline, but by how much?

A 2005 OECD study (101) addressed this question by examining the effect of having the “working age” – commonly assumed to range from 15 to 64 – increase

²³ A further – somewhat controversial – interpretation of these results warrants thought: health (and education) expenditures may be seen as proxies for the size of the welfare state. Hence, the finding that health (and/or education) expenditure enhances economic growth in high-income countries is consistent with the hypothesis that welfare expenditures more than outweigh any distortions caused by the taxation required to support them (93,94). More work is required to validate this hypothesis.

Fig. 4. Predicted size of the EU15 working-age population with and without adjustment of upper working-age limit

Source: Oliveira Martins et al. (101).

along with longevity gains. The authors conservatively set an average increase of 1.2 years per decade in both longevity and retirement age over the years 2005–2050. Fig. 4 shows what would happen to the size of the EU15 working-age population with those increases: the fairly modest adjustment would almost stabilize its size, contrasting markedly to what would happen without such adjustment.

Increasing the working-age population (thus reducing the dependency ratio) should mitigate some of the pressures on health and social expenditures. It also has the potential to contribute positively to the economy at large, although this effect will depend crucially on whether the larger working-age population also participates actively in the labour market and whether employers demand the extra labour. This illustrates the importance of complementarities in reform, some of them clearly beyond the influence of health ministries.

It is not, however, sufficient that additional older workers be in demand. It is also necessary that the additional years of life be spent in reasonably good health, enabling older people to work. Yet none of these assumptions can be guaranteed. Nevertheless, we can at least conclude that potential exists for longevity gains to compensate for the ageing of populations in labour markets.

4. Very limited perspective: health-care costs

Upward pressure on health-care spending during the last two decades has captured policy-makers' attention. One suggestion for containing these costs is to improve population health, which certainly sounds plausible:

healthier people need less health care, which would in turn reduce expenditure. This idea underpinned the influential Wanless report (102), commissioned by the United Kingdom Treasury, but some are sceptical, suggesting that better health status may even increase future health-care spending (103). This section sheds some light on the matter, reviewing relevant studies. We focus on the effect on health expenditures and not the effect on government expenditures in general.

Again, though, the question of whether investing in health will reduce future health-care expenditures is not the relevant criterion when making an economic assessment of the return on investment from a welfare economic perspective, although this has not prevented use of the criterion in public policy debates.

The brief answer to our question, "Does better health lower future health expenditures?" can only be "It depends". Different studies looking at different countries with different data for different health conditions find very different results. We examine some of the factors that influence the results obtained, but first, we remind readers that many other factors also affect health expenditures, as discussed elsewhere (101). Most of these factors, especially technological progress, will most likely continue to contribute to sustained upward pressure on health expenditures. Thus, in terms of health expenditures, improvements in population health can, at best, be expected only to diminish their rate of increase.

We have identified several factors that affect health status and, acting in different directions, could affect health-care expenditure:

Table 6. How different health factors may affect health-care expenditures

Factor	Impact on health-care expenditure
Less disease and disability at a given point in time, for a given population or at a given age	Decrease
Additional years of life	Increase
Lower acute health-care costs of dying at older ages	Decrease
Higher long-term care costs of dying at older ages	Increase
Overall effect	Unknown

- less disease and disability at a given point in time, for a given population or at a given age do lead to lower health-care expenditure at that time;
- however, the longer life that often accompanies better health increases the number of the years over which health-care costs will accumulate;
- on the other hand, acute health-care costs are concentrated in the period just before death, and deaths at older ages actually incur fewer costs, as treatment intensity tends to decline with the age of death;
- however, the costs of long-term social care increase with age, even after controlling for proximity to death, so those costs will be higher for those dying at older ages.

Table 6 sets out these factors and shows their directionality more simply.

We now elaborate on those different factors by reviewing the relevant research findings from within and beyond Europe.

If we limit consideration to an individual at a given point in time, then clearly worse (or better) health is associated with higher (or lower) health-care use and thus expenditure. For instance, Chernichovsky & Markowitz found, using data from Israel in 2003, that the presence of chronic illness had a significant and strong positive impact on the number of visits to a doctor, a specialist and a nurse (104). In the United States, Fried et al., in a study of people aged 72 and older living in New Haven, CT, in 1989, found that

Table 7. Change in health expenditure over 1992–2000, as percentage of total 1992 health expenditure, by different factors, France

Factor	Change in aggregate health expenditures (%)
Change in population age structure	3.2
Increase in population size	3.0
Changes in practices for a given morbidity	22.1
Changes in morbidity	–8.6
Other changes	30.2
Total	49.9

Source: Dormont, Grignon & Huber (106).

functional status was significantly associated with use of health-care services (105).²⁴ The authors estimated that, compared with people living independently, stable dependence or a decline to dependence increased per capita health-care expenditure by about US\$ 10 000 (€6365) over two years.

Dormont, Grignon & Huber calculated that the improvement in health status of the French population between 1992 and 2000 reduced health-care expenditure in 2000 by 8.6% of the country's 1992 health expenditure level (106) (Table 7). However, other factors, in particular technological progress and intensity of clinical intervention among elderly people outweighed these health expenditure savings, such that the total expenditure increased by almost 50%. Also, in their model, the savings from health gains were greater than the costs of ageing (which increased expenditure by 3.2%). This serves as a reminder of the need, in studies at population level, to distinguish between two sets of impacts: those that result from health trends and those that result from changes in the population's age structure.

Manton et al., in an American study, calculated that reduced disability in the Medicare population between 1982 and 1999 accounted for a decline in total Medicare²⁵ costs of US\$ 25.9 billion (€16.5 billion) in 1999 from what they would have otherwise been (107).

24 Services included hospitalization, outpatient and home health care and nursing home.

25 Medicare, the United States' publicly funded health insurance programme, provides coverage to people who are aged 65 and over or meet other criteria.

Table 8. Expected remaining life expectancy and lifetime health-care costs for cohorts with different health-related behaviours

Outcome measure	FHealthy living	Obese	Smokers
Life expectancy at age 20 (years)	64.4	59.9	57.4
Expected remaining lifetime health-care costs per capita at age 20 (€)	281 000	250 000	220 000

Source: van Baal et al. (110).

These studies looked at expenditure between two points in time; other studies try to measure whether avoiding disease and disability at earlier ages might not reduce cumulative health costs over the span of a lifetime: living longer might exhaust the savings gained by healthier earlier years. In fact, the evidence on lifetime health costs is mixed. Some studies do suggest that better health reduces lifetime health-care expenditure; others say it makes little difference; and others suggest it would lead to higher health-care expenditures.

On the positive side, Liu, Daviglus & Yan found that Americans without CVD risk factors in middle age had lower cumulative Medicare expenditure from age 65 until death (or advanced ages) than those with one or more adverse risk factors, even though the former lived longer (108). Shang & Goldman compared projections of total health-care expenditure based on changes in age distribution and on changes in health (derived from life expectancy). They found that ignoring the health effect would overestimate total expenditures by 9% in 2040, by 19% in 2070 and by 22% in 2080 (109).

On the negative side, van Baal et al. predicted that obese people and smokers in The Netherlands would incur lower health-care costs over their lifetimes than healthy people (110). They estimated lifetime costs from age 20 for three hypothetical cohorts: one of “healthy-living” people (neither obese nor having smoked), one of obese people and one of smokers (Table 8). Although annual health expenditure until age 56 was highest for the obese cohort, lifetime health expenditure was highest for the healthy-living cohort, due to longer life expectancy. However, while this may be true²⁶ for The Netherlands, it does not have universal applicability. Recent findings from the United States, where the issue has been far more researched, suggest that the additional lifetime medical cost associated with obesity

will be substantial. According to Yang & Hall elderly men who were overweight or obese at age 65 had 6–13% more lifetime health-care expenditures than the same age cohort within normal weight range at age 65. Elderly women who were overweight or obese at age 65 spent 11–17% more than those in a normal weight range (112). Other studies, again using data from the United States, also had different results from the Dutch, finding somewhat higher lifetime medical expenditures for smokers (113–115).²⁷ Moreover, a major recent United Kingdom report forecasts a significant increase in obesity-related health-care expenditures in its “business-as-usual” scenario up to the year 2050 (116).

Other studies have found that individuals in good health might have only slightly lower lifelong health-care costs than those in worse health. Among them, Lubitz et al. showed that improved functional status at age 70 led to a longer total and active life expectancy, without increasing an individual’s cumulative health-care expenditure (117). For example, the estimated cumulative health-care expenditure of a person with no functional limitations at age 70 would be US\$ 9000 (€5729) (in 1998 dollars) lower than that of a person who experienced limitation in at least one “activity of daily living”, even though their life expectancy would be 2.7 years longer. Joyce et al. also found cumulative health spending to be modestly higher for those chronically ill at age 65 (118). A 65-year-old person with a chronic condition would expect to live 0.3–3.1 years less than someone who was “free of chronic conditions”, but lifetime medical spending would be US\$ 4000–14 000 (€2546–8912) higher. Both these studies used data from the Medicare Current Beneficiary Survey from the 1990s.

Using data from the same survey for 1992–99 and the 1982–96 National Health Interview Surveys, Goldman et

²⁶ Some responses to this study have expressed concern about certain underlying assumptions. Mittendorf, for instance, criticized the use of average health care in the model, instead of distinguishing costs incurred by those who die versus those who survive in the respective year (111). With such distinction, one would see that dying later due to a healthier life reduces the costs of dying. A detailed methodological discussion would also call for scrutiny of other studies with more “optimistic” results.

²⁷ The main reason why the United States studies found high health-care costs for obesity is that it incurs high health-care costs, which – unlike other health behaviour-related risk factors, such as smoking – are not as highly compensated for by the expenditure-reducing effect of earlier death.

Table 9. Projections of acute health care and long-term care expenditure, 2004–2050 and 2005–2050

Expenditure and scenarios	EPC for EU25: public expenditure (% of GDP)		OECD countries: public expenditure (% of GDP)	
	Acute health care	Long-term care	Acute health care	Long-term care
Expenditures in base year (2004 in EPC study and 2005 in OECD study)	6.4	0.9	5.7	1.1
Health scenarios				
Pure ageing or “expansion of morbidity/disability” scenario (2050)	8.1	1.7	8.5	2.8
“Dynamic equilibrium” or intermediate scenario	7.3	1.3	7.7	2.3
“Compression of morbidity/disability” scenario	6.7	0.9	7.0	1.9

Notes. Although we have summarized the EPC and the OECD scenarios using the same terminology for three of their scenarios, the actual definitions and assumptions differ somewhat between the two studies. The details of these definitional differences are of secondary importance in the present context, so the reader may be referred to the original studies. The main point we seek to illustrate is that the future course of health expenditures does differ across the different health scenarios (although it cannot prevent the overall increase).

Sources: EPC (127) and OECD (128).

al. showed how an improvement in the disability status of people over 65 might substantially reduce future per capita annual health-care spending, even though it would not have a great impact on overall health-care spending among this age cohort (119).

Another predictor of health-care expenditure is proximity to death.²⁸ However, the age at which one dies influences the health-care cost of doing so, as older people tend to be treated less intensively (120, 121). Thus, Gandjour & Lauterbach suggest that prevention (and consequently longer life) might actually decrease lifetime costs if one considers the fact that the costs of the last year of life decrease with age (122).

An intriguing insight in this respect was provided by Daviglius et al., who found that being healthier in earlier life reduced the cost of dying (123). In their study, individuals with fewer risk factors²⁹ for CVD in young adulthood or middle age (ages 33–64) incurred lower hospital expenditures in their last year of life. For example, the total charges³⁰ in the last year of life in the period 1984–2002 for individuals without any risk factor at younger ages were US\$ 15 318 (€9750) lower than for those who had four or more risk factors. This was not solely a result of lower costs associated with CVD, which accounted for US\$ 10 267 (€6526) of the total. The combined effects of these observations do suggest

that improvements in the health of those alive today will, all else being equal, reduce costs when they die.

On the other hand again, expenditure on long-term care does seem to increase with both age and proximity to death (124–126), so the longer people live, the higher that part of the overall health expenditures will be.

Finally, the European Policy Committee (EPC) (127) and OECD (128) each recently performed projections of public health-care expenditure. They calculated the potential for future savings in public health-care expenditures under different health scenarios. Summarized results are in Table 9, although the numbers cannot be compared directly as they use different methodologies and assumptions in each health scenario.

These projections suggest that better health could perhaps mitigate but not prevent entirely projected increases in future health-care expenditure. Once again, though, other factors influencing both the supply and demand for health care seem to have a greater impact on aggregate expenditure.

So what can be concluded from this highly condensed review of the impact of health on health-care expenditure? The optimistic expectation that improved health in the future (achieved by greater efforts and

28 Raitano offers an empirical literature review (120).

29 The authors controlled for six risk factors for CVD at younger ages (blood pressure, serum cholesterol, body mass index, current smoker or not, diagnosed diabetes, minor electrocardiograms abnormalities) as well as for age at death, race, sex and education.

30 Costs included inpatient care, skilled-nursing facility and outpatient hospital-related care.

investment today) will significantly mitigate or even reverse the trend of increasing health expenditures cannot be supported by the evidence presented here. Even if better health may, in some circumstances, lead to lower health-care spending, other cost drivers, in particular technological advances, will more than outweigh any such expenditure-reducing effect. On the other hand, there is not much support for the hypothesis that better health by itself is a major cost driver.

One final caution: Much of the research reviewed here is from the United States, and important structural differences preclude comparison with European systems. It is essential that research of this type be given a much higher priority in Europe, both in terms of direct support and support for the infrastructure, such as cohorts and panel surveys that make it possible.

5. Concluding remarks

This report documents the evidence on some of the main dimensions of the economic costs of ill health (or the economic benefits of good health) that are relevant to the WHO European Region. We presented three different concepts of economic costs, each policy relevant in its own way. We started from the broadest and – in the view of most economists – most relevant perspective, the idea that the value of improved health (and thus the cost of ill health) is represented by the value that people individually attribute to it. Although difficult to measure in practice and not infinite, it is clearly very high. This broad or “true” economic cost concept explicitly acknowledges the intrinsic value of health, a feature not shared by the other concepts presented here. Consequently, it demonstrates the falsity of what is all too often presented as a strict dichotomy between the “health benefits” resulting from health investment on one hand and the “economic benefits” on the other. The difference lies chiefly in the measurement unit, not in the (mistaken) idea that economists would not consider the health gains by themselves as relevant.

We then discussed two more-limited concepts of economic costs. The first was the economic consequences for individuals (microeconomic) and for the economy as a whole (macroeconomic). Considerable research shows that ill health negatively affects several labour market outcomes at the individual level. Evidence on the impact of health at the macroeconomic level is

by contrast more mixed, highlighting the need for research. The second was whether improved health can save health-care costs. We found a range of factors at play, some partly offsetting the others: the ultimate answer is a matter for empirical enquiry. Yet, even if better health will yield some savings in health-care costs (which may be optimistic) such savings will likely be small and probably pale against the dominant cost drivers, such as technological developments.

Given limited space, we were unable to include all the evidence or cover other important economic cost concepts, particularly the distinction between costs that justify public policy interventions from an economic perspective and those that do not – for instance, the distinction between external and internal costs.³¹ As part of the microeconomic cost, we have not documented the important time and labour market costs caused to household members who care for those who fell ill.³² Nor have we discussed the very recent research findings on economic cost of health inequalities, an extension of the concepts presented in here.³³

The opportunity to do full justice to the enormous heterogeneity in the European Region, both in terms of economic and health measures, has also been restricted by the space available. Our earlier work attempts to situate the economic arguments in the specific socioeconomic context of the countries concerned (especially Suhrcke et al. (3)), and this is clearly what is needed to provide a credible assessment of the potential macroeconomic benefits of investing in health. At a more abstract level, and at the risk of over-simplifying, it is reasonable to assume that decreasing marginal returns also apply in health: the healthier a population is, the more difficult (and costly) it will be to realize additional health gains and thus any associated economic benefits. Given the significant economic benefits we demonstrated even in the richer parts of the European Region, there is reason to believe that, although additional gains may be smaller in absolute terms, they may still be positive.

31 Suhrcke et al. offer an extensive discussion of these arguments in the context of chronic diseases (4).

32 Mete provides evidence on the substantial time invested by other household members in caring for chronically ill or disabled household members in Estonia, Hungary and Romania (26), while Suhrcke et al. provide the same on impacts on the labour market (2).

33 Mackenbach, Merding & Kunst present such work in the context of the European Union (129), and Dow & Schoeni for the United States (130).

References

1. *Macroeconomics and health: investing in health for economic development*. Geneva, WHO Commission on Macroeconomics and Health, 2001.
2. Suhrcke M et al. *The contribution of health to the economy in the European Union*. Brussels, European Commission, 2005.
3. Suhrcke M, Rocco L, McKee M. *Health: a vital investment for economic development in eastern Europe and central Asia*. Copenhagen, WHO Regional Office for Europe, 2007 (http://www.euro.who.int/observatory/Publications/20070618_1, accessed 5 May 2008).
4. Suhrcke M, et al. *Chronic disease: an economic perspective*. London, Oxford Health Alliance, 2006.
5. *Public finance balance of smoking in the Czech Republic*. Prague, Arthur D Little International, Inc., 2000 (<http://www.tobaccofreekids.org/reports/philipmorris/pmczechstudy.pdf>, accessed 5 May 2008).
6. Leonhardt D. Free lunch on health? Think again. *New York Times*, 8 August 2007 (<http://www.nytimes.com/2007/08/08/business/08leonhardt.html>, accessed 5 May 2008).
7. Haacker M. *The macroeconomics of HIV/AIDS*. Washington, DC, International Monetary Fund, 2004.
8. Laxminarayan R et al. *Economic benefit of tuberculosis control*. Washington, DC, World Bank, 2007 (Policy Research Working Paper No. 4295).
9. Viscusi WK, Aldy JE. *The value of a statistical life: a critical review of market estimates throughout the world*. Washington, DC, National Bureau of Economic Research, 2003 (NBER Working Paper 9487).
10. Usher D. An imputation to the measure of economic growth for changes in life expectancy. In: Moss M, ed. *The measurement of economic and social performance*. New York, Columbia University Press for National Bureau of Economic Research, 1973:193–226.
11. Nordhaus W. The health of nations: the contribution of improved health to living standards. In: Murphy KM and Topel RH, eds. *Exceptional returns: the value of medical research*. Chicago, University of Chicago Press, 2003:9–40.
12. Costa DL, Kahn ME. *Changes in the value of life, 1940–1980*. Cambridge, MA, Massachusetts Institute of Technology, 2003.
13. Crafts N. *The contribution of increased life expectancy to growth of living standards in the United Kingdom, 1870–2001*. London, London School of Economics, 2005. (Working Paper; <http://wpeg.group.shef.ac.uk/documents/crafts.pdf>, accessed 5 May 2008).
14. Cutler D, Richardson E. Measuring the health of the US population [Brookings Papers on Economic Activity]. *Microeconomics*, 1997, 29:519–539.
15. Miller TR. Variations between countries in values of statistical life. *Journal of Transport Economics and Policy*, 2000, 34(2):169–188.
16. Becker GS, Philipson TJ, Soares RR. The quantity and quality of life and the evolution of world inequality. *American Economic Review*, 2005, 95(1):277–291.
17. Soares RR. Health and the evolution of welfare across Brazilian municipalities. *Journal of Development Economics*, 2007, 84(2):590–608.
18. Suhrcke M, Võrk A, Mazzucco S. *The economic consequences of ill health in Estonia*. Copenhagen, WHO Regional Office for Europe, Europe and Tallinn, Praxis Center for Policy Studies, 2006.
19. Currie J, Madrian BC. Health, health insurance and the labour market. In: Ashenfelter O, Card D, eds. *Handbook of labour economics*, Vol. 3. Amsterdam, Elsevier Science, 1999:3309–3415.
20. Strauss J, Thomas D. Health, nutrition and economic development. *Journal of Economic Literature*, 1998, 36:766–817.
21. McCain MN, Mustard JF. *Reversing the real brain drain: early years study, final report*. Toronto, Ontario Children's Secretariat, 1999.
22. EUROSTAT [online database]. Brussels, European Commission, 2008 (<http://europa.ec/eurostat/>, accessed 15 February 2008).
23. Griliches Z. The search for R&D spillovers. *The Scandinavian Journal of Economics*, 1992, 94:29–47.
24. Nadiri MI. *Innovations and technological spillovers*. New York, CV Starr Center for Applied Economics, New York University, 1993 (Economic Research Report 93-31).
25. Silverstein SC, Garrison HH, Heinig SJ. A few basic economic facts about research in the medical and related life sciences. *The FASEB Journal*, 1995, 9(July).

26. Pardes H et al. Effects of medical research on health care and the economy. *Science*, 1999, 283:36–37.
27. Bloom D, Canning D, Graham B. Longevity and life cycle savings. *Scandinavian Journal of Economics*, 2003, 105(3):319–338.
28. Mete C. *Economic implications of chronic illness and disability in eastern Europe and the former Soviet Union*. Washington, DC, World Bank, 2008.
29. Jones A. *Applied econometrics for health economists: a practical guide*, 2nd ed. Oxford and Seattle, Radcliffe Publishing, Office of Health Economics, 2007.
30. Mankiw N, Gregory DR, Weil DN. A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 1992, 107(2):407–437.
31. Gambin LM. *The impact of health on wages in Europe – does gender matter?* York, University of York, Department of Economics, 2005 (Health, Econometrics and Data Group, Working Paper No. 05/03).
32. Contoyannis P, Rice N. The impact of health on wages: evidence from the British Household Panel Survey. *Empirical Economics*, 2001, 26:599–622.
33. Hausman JA, Taylor WE. Panel data and unobservable individual effect. *Econometrica*, 1981, 49:1377–1398.
34. Amemiya T, MaCurdy T. Instrumental variables estimation of an error components model. *Econometrica*, 1986, 54:869–880.
35. Breusch T, Mizon G, Schmidt P. Efficient estimation using panel data. *Econometrica*, 1989, 57:695–700.
36. Jäckle R. Health and wages: panel data estimates considering selection and endogeneity. Munich, Ifo Institute for Economic Research, University of Munich, 2007 (Working Paper No. 43).
37. Wooldridge JM. Selection corrections for panel data models under conditional mean independence assumptions. *Journal of Econometrics*, 1995, 68:115–132.
38. Semykina A, Wooldridge JM. *Estimating panel data models in the presence of endogeneity and selection: theory and application*. Tallahassee, FL, Florida State University, 2006.
39. Lechner M, Vazquez-Alvarez R. *The effect of disability on labour market outcomes in Germany: evidence from matching*. London, Centre for Economic Policy Research, 2004 (Discussion Paper No. 4223).
40. World Bank *Repositioning nutrition as central to development: a strategy for large-scale action*. Washington, DC, World Bank, 2006.
41. Gillespie S, McLachlan M, Shrimpton R. *Combating malnutrition: time to act*. Washington, DC, World Bank, 2003.
42. Rokx C, Galloway R, Brown L. *Prospects for improving nutrition in eastern Europe and central Asia*. Washington, World Bank, 2002.
43. *The Micronutrient Initiative: vitamin and mineral deficiency: a global assessment*. Ottawa, United Nations Children's Fund and The Micronutrient Initiative, 2004.
44. Levine PB, Gustafson TA, Valenichik AD. More bad news for smokers? The effects of cigarette smoking on wages. *Industrial and Labor Relations Review*, 1997, 50:493–509.
45. Lokshin M, Beegle K. *Forgone earnings from smoking: evidence for a developing country*. Washington, DC, World Bank, 2006 (Policy Research Working Paper Series 4018).
46. Auld MC. Smoking, drinking and income. *Journal of Human Resources*, 2005, 40(2):505–518.
47. Lee Y. *Wage effects of drinking and smoking: an analysis using Australian twins data*. Perth, University of Western Australia, 1999 (Working Paper No. 99-22).
48. Lye JN, Hirschberg J. Alcohol consumption, smoking and wages. *Applied Economics*, 2004, 36:1807–1817.
49. van Ours JC. A pint a day raises a man's pay; but smoking blows that gain away. *Journal of Health Economics*, 2004, 23:863–886.
50. MacDonald Z, Shields MA. The impact of alcohol consumption on occupational attainment in England. *Economica*, 2001, 68(271):427–453.
51. Keng S-H, Huffman WE. Binge drinking and labor market success: a longitudinal study on young people. *Journal of Population Economics*, 2007, 20(1):35–54.
52. Mullahy J, Sindelar JL. Health, income, and risk aversion: assessing some welfare costs of alcoholism and poor health. *Journal of Human Resources*, 1995, 30(3):439–459.
53. Johansson E et al. The association of alcohol dependency with employment probability: evidence from the population survey "Health 2000 in Finland". *Health Economics*, 2007, 16(7):739–754.

54. Johansson E et al. Abstaining from alcohol and labour market underperformance – have we forgotten the “dry” alcoholics? *Alcohol and Alcoholism*, 2006, 41(5):574–579.
55. Cawley J. The impact of obesity on wages. *Journal of Human Resources*, 2004, 39(2):451–474.
56. Cawley J, Danziger S. Obesity as a barrier to employment and earnings for current and former welfare recipients. Washington, DC, National Bureau of Economic Research, 2004 (NBER Working Paper No. 10508).
57. Burkhauser RV, Cawley J. Beyond BMI: the value of more accurate measures of fatness and obesity in social science research. *Journal of Health Economics*, forthcoming.
58. García Gómez P. *Institutions, health shocks and labour outcomes across Europe*. Madrid, Fundación de Estudios de Economía Aplicada, 2008 (FEDEA working paper no. 2008-01; <http://www.fedea.es/pub/Papers/2008/dt2008-01.pdf>, accessed 6 May 2008).
59. Gannon B. A dynamic analysis of disability and labour force participation in Ireland. *Health Economics*, 2005, 14:925–938.
60. Wolff FC. Disability and labour supply during economic transition: evidence from Bulgaria. *Labour*, 2005, 19(2):303–341.
61. Sammartino FJ. The effect of health on retirement. *Social Security Bulletin*, 1987, 50(2):31–47.
62. Deschryvere M. *Health and retirement decisions: an update of the literature*. Helsinki, Elinkeinoelämän Tutkimuslaitos (ETLA), 2004 (ETLA Discussion Papers No. 932).
63. Lindeboom M. Health and work of older workers. In: Jones AM, ed. *The Elgar companion to health economics*. Cheltenham, Edward Elgar Publishing, 2006:26–35.
64. Gruber J, Wise DA. *Social security and retirement around the world*. Chicago and London, University of Chicago Press, 1999 (NBER Conference Report Series).
65. Hagan R, Jones AM, Rice N. *Health and retirement in Europe*. York, University of York, Health Economics Research Centre, 2006 (HEDG Working Paper 06/10).
66. Kalwij A, Vermeulen F. *Labour force participation of the elderly in Europe: the importance of being healthy*. Bonn, Institute for the Study of Labor, 2005 (Discussion Paper No. 1887).
67. Kerkhofs M, Lindeboom M, Theeuwes J. Retirement, financial incentives and health. *Labour Economics*, 1999, 6:203–227.
68. Lindeboom M, Kerkhofs M. *Subjective health measures, reporting errors and endogeneity in the relationship between health and work*. Rome, University of Rome Tor Vergata, Centre for Economic and International Studies, 2006 (Research Paper Series, 16(46)).
69. Roberts J et al. *Health, retirement and inequality: can Germany and the United Kingdom learn from each other?* London, Anglo German Foundation, 2006.
70. Disney R, Emmerson C, Wakefield M. *Ill health and retirement in Britain: a panel data-based analysis*. London, Institute for Fiscal Studies, 2006 (IFS Working Paper No. 03/02).
71. Siddiqui S. The impact of health on retirement behaviour: empirical evidence from West Germany. *Econometrics and Health Economics*, 1997, 6:425–438.
72. Jiménez-Martín S, Labeaga JM, Vilaplana Prieto C. *A sequential model for older workers' labor transitions after a health shock*. Social Science Research Network, 2005 (<http://ssrn.com/abstract=1001630>, accessed 5 May 2008).
73. Datta Gupta N, Larsen M. Do health shocks increase retirement more when workers are universally insured? *The Well-Being of the Elderly: Income, Consumption, and Health – Cross-Country Perspectives, Bonn, 22–23 May 2006* (http://www.iza.org/conference_files/eld2006/datta%20gupta_n349.pdf, accessed 5 May 2008).
74. Favaro D, Suhrcke M. Health as a driver of economic development: conceptual framework and related evidence for south-eastern Europe. In: *Health and economic development in south-eastern Europe*. Copenhagen, WHO Regional Office for Europe, and Paris, Council of Europe Development Bank, 2006:71–85 (<http://www.euro.who.int/Document/E89184.pdf>, accessed 5 May 2008).
75. Gallup JL, Sachs JD. The economic burden of malaria. *American Journal of Tropical Medicine and Hygiene*, 2001, 64:85–96.
76. Bell C, Devarajan S, Gersbach H. The long-run economic costs of AIDS: a model and an application to South Africa. *World Bank Economic Review*, 2006, 20:55–89.
77. Weil DN. Accounting for the effect of health on economic growth. *Quarterly Journal of Economics*, 2007, 122(August):1265–1306.

78. Fogel RW. Economic growth, population theory and physiology: the bearing of long-term process on the making of economic policy. *The American Economic Review*, 1994 84(3):369–395.
79. Arora S. Health, human productivity, and long-term economic growth. *The Journal of Economic History*, 2001, 61(3):699–749.
80. Kalemli-Ozcan S, Ryder HE, Weil DN. Mortality decline, human capital investment and economic growth. *Journal of Development Economics*, 2000, 62:1–23.
81. Alsan M, Bloom D, Canning D. *The effect of population health on foreign direct investment*. Cambridge, MA, National Bureau for Economic Research, 2004 (NBER Working Paper 10596).
82. Bloom D, Canning D, Sevilla J. *Health, worker productivity and economic growth*. Pittsburgh, School of Public Policy and Management, Carnegie Mellon University, 2002.
83. Levine R, Renelt D. A sensitivity analysis of cross-country growth regressions. *American Economic Review*, 1992, 82:942–963.
84. Sala-I-Martin X, Doppelhofer G, Miller RI. Determinants of long-term growth: a Bayesian averaging of classical estimates (BACE) approach. *American Economic Review*, 2004, 94(4):813–835.
85. Barro RJ. *Determinants of economic growth: a cross-country empirical study*, Cambridge, MA, MIT Press, 1997.
86. Acemoglu D, Johnson S. Disease and development: the effect of life expectancy on economic growth. *Journal of Political Economy*, 2007, 115(6): 925–985.
87. Ashraf QH, Lester A, Weil DN. *When does improving health raise GDP?* Providence, RI, Economics Department, Brown University, 2008.
88. Bhargava A et al. Modelling the effects of health on economic growth. *Journal of Health Economics*, 2001, 20:423–440.
89. Jamison D, Lau L, Wang J. *Health's contribution to economic growth in an environment of partially endogenous technical progress*. Disease Control Priorities Project. Bethesda, MD, Fogarty International Centre, National Institutes for Health, 2004 (Working Paper No. 10; <http://www.dcp2.org/file/25/wp10.pdf>, accessed 5 May 2008).
90. Beraldo S, Montolio D, Turati G. *Healthy, educated and wealthy: is the welfare state really harmful for growth?* Barcelona, University of Barcelona, Espai de Recerca en Economia, 2005 (Working Papers in Economics 127).
91. Rivera B, Currais L. Economic growth and health: direct impact or reverse causation? *Applied Economics Letters*, 1999, 6:761–764.
92. Rivera B, Currais L. Income variation and health expenditure: evidence for OECD countries. *Review of Development Economics*, 1999, 3(3):258–267.
93. Lindert P. *Growing public: social spending and economics growth since the eighteenth century: two volumes*. Cambridge, MA, Cambridge University Press, 2004.
94. Atkinson AB. The scope for a European growth initiative: is the welfare state necessarily an obstacle to economic growth? *European Economic Review*, 1995, 39:723–730.
95. Knowles S, Owen PD. Education and health in an effective-labour empirical growth model. *Economic Record*, 1997, 73(223):314–328.
96. Knowles S, Owen P. Health capital in cross-country variation in income per capita in the Mankiw-Romer-Weil model. *Economic Letters*, 1995, 48:99–106.
97. Tompa E. *The impact of health on productivity: empirical evidence and policy implications*. Ontario, Centre for the Study of Living Standards, 2002 (Economic Papers; <http://www.csls.ca/rep/2/emiletompa.pdf>, accessed 5 May 2008).
98. Suhrcke M, Urban D. *Are cardiovascular diseases bad for economic growth?* Munich, CESifo, 2006 (CESifo Working Paper No. 1845).
99. Pritchett L. The quest continues. *Finance and Development*, 2006, March: 18–22.
100. Burniaux J-M, Duval R, Jaumotte F. *Coping with ageing: a dynamic approach to quantify the impact of alternative policy options on future labour supply in OECD countries*. Paris, Organisation for Economic Co-operation and Development, 2003 (Working Papers No. 371).
101. Oliveira Martins J et al. *The impact of ageing on demand, factor markets and growth*. Paris, Organisation for Economic Co-operation and Development, 2005 (Economics Working Paper No. 420).

102. Wanless D. *Securing our future health: taking a long-term view*. London, HM Treasury, 2002 (http://www.hm-treasury.gov.uk/Consultations_and_legislation/wanless/consult_wanless_final.cfm, accessed 5 May 2008).
103. Zweifel P, Steinmann L, Eugster P. The Sisyphus syndrome in health revisited. *International Journal of Health Care Finance and Economics*, 2005, 5:127–145.
104. Chernichovsky D, Markowitz S. Aging and aggregate costs of medical care: conceptual and policy issues. *Health Economics*, 2004, 13:543–562.
105. Fried TR et al. Functional disability and health care expenditures for older persons. *Archives of Internal Medicine*, 2001, 161(21):2602–2607.
106. Dormont H, Grignon M, Huber H. Health expenditure growth: reassessing the threat of ageing. *Health Economics*, 2006, 15:947–963.
107. Manton KG et al. Labor force participation and human capital increases in an aging population and implications for U.S. research investment. *Proceedings of the National Academy of Sciences of the United States of America*, 2007, 104(26).
108. Liu K, Daviglius ML, Yan L. Cardiovascular disease (CVD) risk factor status earlier in adulthood and cumulative health care costs from age 65 to the point of death. *Circulation*, 2003, 108:iv–722.
109. Shang B, Goldman D. Does age or life expectancy better predict health care expenditures? *Health Economics*, 2007, 17(4):487–501.
110. van Baal PHM et al. Lifetime medical costs of obesity: prevention no cure for increasing health expenditure. *PLoS Medicine*, 2008, 5(2):e29 (<http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371%2Fjournal.pmed.0050029&ct=1>, accessed 5 May 2008).
111. Mittendorf T. Are average cost figures correct in this context? Response to van Baal et al. *PLoS Medicine*, 2008 (<http://medicine.plosjournals.org/perlserv/?request=read-response&doi=10.1371/journal.pmed.0050029#r2109>, accessed 5 May 2008).
112. Yang Z, Hall AG. The financial burden of overweight and obesity among elderly Americans: the dynamics of weight, longevity, and health care cost. *Health Services Research*, 2007 (doi:10.1111/j.1475-6773.2007.00801).
113. Lakdawalla DN, Goldman DP, Shang B. The health and cost consequences of obesity among the future elderly. *Health Affairs*, 2005, 24(2):W5R30–W5R41.
114. Goldman DP et al. The value of elderly disease prevention. *Forum for Health Economics & Policy*. 2006, 9(2) (http://www.bepress.com/fhiep/biomedical_research/1, accessed 5 May 2008).
115. Sloan F et al. *The price of smoking*. Cambridge, MA, and London, MIT Press, 2004.
116. Butland B et al. *Tackling obesities: future choices – Project report*. London, Foresight, 2007 (http://www.foresight.gov.uk/Obesity/Obesity_final/Index.html, accessed 5 May 2008).
117. Lubitz J et al. Health, life expectancy, and health care spending among the elderly. *New England Journal of Medicine*, 2003, 349:1048–1055.
118. Joyce GF et al. The lifetime burden of chronic disease among the elderly. *Health Affairs (Millwood)*, 2005, 24(Suppl. 2):W5R18–W5R29.
119. Goldman DP et al. Consequences of health trends and medical innovation for the future elderly. *Health Affairs (Millwood)*, 2005, 24 Suppl 2:W5R5–W5R17.
120. Raitano M. *The impact of death-related costs on health-care expenditure: a survey*, 2006 (European Network of Economic Policy Research Institutes, Research Report No. 17; <http://www.enepri.org/files/Publications/RR17.pdf>, accessed 5 May 2008).
121. Seshamani M, Gray A. Ageing and health-care expenditure: the red herring argument revisited. *Health Economics*, 2004, 13:303–314.
122. Gandjour A, Lauterbach KW. Does prevention save costs? Considering deferral of the expensive last year of life. *Journal of Health Economics*, 2005, 24:715–724.
123. Daviglius ML et al. Cardiovascular risk profile earlier in life and medicare costs in the last year of life. *Archives of Internal Medicine*, 2005, 165:1028–1034.
124. Yang Z, Norton EC, Stearns SC. Longevity and health care expenditures: the real reasons older people spend more. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 2003, 58(1):S2–S10.
125. Spillman BC, Lubitz J. The effect of longevity on spending for acute and long-term care. *New England Journal of Medicine*, 2000, 342(19):1409–1415.

126. Werblow A, Felder S, Zweifel P. Population ageing and health care expenditure: a school of "red herrings"? *Health Economics*, 2007, 16(10):1109–1126.

127. European Policy Committee. *The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, health care, long-term care, education and unemployment transfers (2004-2050)*, 2006 (European Commission Directorate-General for Economic and Financial Affairs, Special Report No. 1).

128. OECD. *Projecting OECD health and long-term care expenditures: what are the main drivers?*, Economics Department Working Papers, No. 477. Paris, Organisation for Economic Cooperation and Development, 2006.

129. Mackenbach J, Jan Meerding W, Kunst AE. *Economic implications of socio-economic inequalities in health in the European Union*. 2007, European Commission, Health & Consumer Protection Directorate General: Brussels, 2007.

130. Dow W, Schoeni RF. *Economic value of improving the health of disadvantaged Americans 2008* Technical report for "Overcoming obstacles to health: report from the Robert Wood Johnson Foundation to the Commission to Build a Healthier America". <http://www.commissiononhealth.org/Publications.aspx>, accessed 18 April 2008).

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WHO European Ministerial
Conference on Health Systems:
"HEALTH SYSTEMS.
HEALTH AND WEALTH"

Tallinn, Estonia, 25–27 June 2008

This report is one of three background documents prepared for the WHO European Ministerial Conference on Health Systems: "Health Systems, Health and Wealth", held on 25–27 June 2008 in Tallinn, Estonia. Together, these reports demonstrate that:

- ill health is a substantial burden economically and in terms of societal well-being;
- well-run health systems can improve health and well-being, and contribute to wealthier societies, and
- strategies are available to improve health systems' performance.

These are the key themes of the Conference. These detailed syntheses highlight important research findings and their implications, and underline the challenges that they pose for policy-makers. They support the Conference position that cost-effective and appropriate spending on health systems is a good investment that can benefit health, wealth and well-being in their widest senses.

These three background documents together provide the theoretical foundations around which the aims, arguments and rationale for the Conference are oriented. Document 1 gives the background evidence on the cost of ill health and is supported by twin volumes on health as a vital investment in eastern and western Europe. Documents 2 and 3 represent concise synopses of the two comprehensive Conference volumes being coordinated by the European Observatory on Health Systems and Policies. These volumes on health systems, health and wealth and performance involve a range of leading experts and will be made available to delegates in draft for comment. They will be revised in light of feedback before publication at the end of 2008.

Background document #1 **The Economic Costs of Ill health in the European Region**

This summary examines the potential impact of better health on wealth in the WHO European Region. It takes forward the work of the WHO Commission on Macroeconomics and Health and the European Commission's Directorate-General for Health and Consumer Protection to assess the costs of ill health for the European Region. It marshals existing evidence on micro and macro economic costs and makes the case for welfare costs to be factored into economic evaluation of health improvements. It presents a compelling case for governments to invest in the health of their populations.